

**SIXTH FIVE-YEAR REVIEW REPORT FOR
BAYOU BONFOUCA SUPERFUND SITE
ST. TAMMANY PARISH, LOUISIANA**



JULY 2021



1993



2019

Prepared by

**U.S. Environmental Protection Agency
Region 6
Dallas, Texas**

**SIXTH FIVE-YEAR REVIEW REPORT
BAYOU BONFOUCA SUPERFUND SITE
EPA ID#: LAD980745632
ST. TAMMANY PARISH, LOUISIANA**

This memorandum documents the U.S. Environmental Protection Agency's performance, determinations and approval of the Bayou Bonfouca Superfund site (Site) sixth five-year review under Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S. Code § 9621(c), as provided in the attached sixth Five-Year Review Report.

Summary of the Sixth Five-Year Review Report

The Site is located in Slidell, St. Tammany Parish, Louisiana, where a creosote plant operated from 1882 to the early 1970s. During operations, numerous releases of creosote took place from spills, runoff and discharges. In the early 1970s, a fire at the plant ruptured several large storage tanks, causing creosote to flow onto the Site and into the bayou. Operations contaminated soil, sediment and groundwater. EPA completed the cleanup of contaminated soils and sediment in 1997. Today, groundwater extraction, treatment and monitoring are ongoing. The groundwater recovery arrays capture about 700 gallons of dense non aqueous phase liquid (DNAPL) per year. Despite years of operating the groundwater treatment system, the extent of DNAPL and groundwater contamination are not fully known and require additional delineation. EPA is conducting a supplemental remedial investigation to evaluate potential modifications and/or remedial approaches to enhance capture of DNAPL and contaminated groundwater. Institutional controls are in place for on-site groundwater and soil via a 2008 Conveyance Notification. EPA is working with St. Tammany Parish to identify appropriate controls to inform residents of groundwater contamination and prevent groundwater use in the residential area across the bayou. Institutional controls are not required by site decision documents, but institutional controls may be needed to ensure long-term protectiveness. Per 2018 site investigations, concentrations of contaminants in surface soil and subsurface soil were present in excess of State Risk Evaluation/Corrective Action Program (RECAP) limiting standards and EPA regional screening levels (RSLs). Delineation of the shallow contamination is part of upcoming Site investigation activities. Options for engineering controls, institutional controls or removal of contaminated shallow soils will be evaluated at that time. Additionally, further evaluation of the vapor intrusion pathway will be conducted using EPA's vapor intrusion guidance for the residential area.

Performance Measures

Human Exposure Under Control: Yes

Groundwater Migration Under Control: Insufficient Data

Construction Complete: Yes

Site-Wide Ready for Anticipated Use: Yes

Actions Needed

The following actions must be taken for the remedy to be protective over the long term:

- Evaluate the need for institutional controls and document in a decision document as appropriate.
- Collect additional data to further investigate areas with soil contaminants above RECAP limiting standards and EPA RSLs and determine whether additional response actions are needed.
- Work with St. Tammany Parish to identify appropriate controls to inform residents of groundwater contamination and prevent groundwater use in the residential area near extraction well Array 3.
- Delineate the DNAPL source and groundwater contaminant plumes. Evaluate the well network, groundwater flow, potential migration to surface water and contaminants sampled.
- Conduct a supplemental investigation to evaluate potential modifications and/or remedial approaches to enhance capture of DNAPL and contaminated groundwater.
- Further evaluate the vapor intrusion pathway using EPA's vapor intrusion guidance for residential area near extraction well Array 3.

Determination

I have determined that the remedy for the Bayou Bonfouca Superfund site is currently protective of human health and the environment in the short term. This five-year review report specifies the actions that need to be taken for the remedy to remain protective over the long term.

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BAYOU BONFOUCA SUPERFUND SITE
EPA ID#: LAD980745632
ST. TAMMANY PARISH, LOUISIANA**

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ISSUES/RECOMMENDATIONS

SIXTH FIVE-YEAR REVIEW REPORT
BAYOU BONFOUCA SUPERFUND SITE
EPA ID#: LAD980745632
ST. TAMMANY PARISH, LOUISIANA

Issues and Recommendations Identified in the FYR:

| | | | | |
|--------------------------------------|---|--------------------------|---------------------------------------|-----------------------|
| OU(s): 1 and 2 | Issue Category: Institutional Controls | | | |
| | Issue: Institutional controls are not included in a decision document. | | | |
| | Recommendation: Evaluate the need for institutional controls and document in a decision document as appropriate. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA/State | EPA/State | 9/30/2024 |

| | | | | |
|--------------------------------------|---|--------------------------|---------------------------------------|-----------------------|
| OU(s): 2 | Issue Category: Institutional Controls | | | |
| | Issue: Institutional controls are not in place for off-site groundwater at the residential properties across the bayou near Array 3. | | | |
| | Recommendation: Work with St. Tammany Parish to identify appropriate controls to inform residents of groundwater contamination and prevent groundwater use in the residential area near Array 3. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA/State | EPA/State | 8/12/2023 |

| | | | | |
|--------------------------------------|---|--------------------------|---------------------------------------|-----------------------|
| OU(s): 2 | Issue Category: Monitoring | | | |
| | Issue: The DNAPL source plume has not been fully delineated. Groundwater contamination has not been fully delineated. | | | |
| | Recommendation: Delineate the DNAPL source and groundwater contaminant plumes. Evaluate the well network, groundwater flow, potential migration to surface water and contaminants sampled. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA | EPA/State | 8/12/2023 |

| | | | | |
|--------------------------------------|--|--------------------------|---------------------------------------|-----------------------|
| OU(s): 2 | Issue Category: Remedy Performance | | | |
| | Issue: Investigations indicated a portion of the DNAPL plume is potentially circumventing the southwest end of Array 2 and the northern portion of Array 3. | | | |
| | Recommendation: Conduct a supplemental investigation to evaluate potential modifications and/or remedial approaches to enhance capture of DNAPL and contaminated groundwater. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA | EPA/State | 8/12/2023 |

| | | | | |
|--------------------------------------|--|--------------------------|---------------------------------------|-----------------------|
| OU(s): 1 | Issue Category: Other | | | |
| | Issue: Per the 2018 site investigations, concentrations of contaminants in surface soil and subsurface soil were present in excess of Louisiana RECAP limiting standards and EPA RSLs. | | | |
| | Recommendation: Collect additional data to further investigate areas with soil contaminants above Louisiana RECAP limiting standards and EPA RSLs and determine whether additional response actions are needed. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA/State | EPA/State | 8/12/2023 |

| | | | | |
|--------------------------------------|---|--------------------------|---------------------------------------|-----------------------|
| OU(s): 2 | Issue Category: Other | | | |
| | Issue: EPA's screening level vapor intrusion review indicated that further vapor intrusion evaluation is appropriate in the residential area near Array 3. | | | |
| | Recommendation: Further evaluate the vapor intrusion pathway using EPA's vapor intrusion guidance for residential area near Array 3. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA | EPA/State | 8/12/2023 |

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LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|----------|---|
| AOI-ES | Areas of Investigation for Enclosed Structures |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| bgs | Below Ground Surface |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| CIC | Community Involvement Coordinator |
| COC | Contaminant of Concern |
| DNAPL | Dense Non-Aqueous Phase Liquid |
| EPA | United States Environmental Protection Agency |
| ERT | Environmental Response Team |
| ESD | Explanation of Significant Differences |
| FYR | Five-Year Review |
| GWESNI | Groundwater Enclosed Structure Non-Industrial Standard |
| HQ | Hazard Quotient |
| IC | Institutional Control |
| LDEQ | Louisiana Department of Environmental Quality |
| MCL | Maximum Contaminant Level |
| MO | Management Option |
| mg/kg | Milligrams per Kilogram |
| µg/L | Micrograms per Liter |
| NCP | National Contingency Plan |
| ng/L | Nanograms per Liter |
| NPDES | National Pollutant Discharge Elimination System |
| NPL | National Priorities List |
| O&M | Operation and Maintenance |
| OU | Operable Unit |
| PAH | Polycyclic Aromatic Hydrocarbon |
| RAO | Remedial Action Objective |
| RCRA | Resource Conservation and Recovery Act |
| RECAP | Risk Evaluation/Corrective Action Program |
| RI/FS | Remedial Investigation/ Feasibility Study |
| ROD | Record of Decision |
| RPM | Remedial Project Manager |
| RSL | Regional Screening Level |
| SEMS | Southern Environmental Management and Specialties Inc. |
| SoilESI | Soil Enclosed Structure Industrial Standard |
| SoilESNI | Soil Enclosed Structure Non-Industrial Standard |
| SoilSAT | Saturation Limit in Soil |
| SVOC | Semi-Volatile Organic Compound |
| UU/UE | Unlimited Use/Unrestricted Exposure |
| VISL | Vapor Intrusion Screening Level |
| VOC | Volatile Organic Compound |

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, 42 U.S.C. §9621, consistent with the National Contingency Plan (NCP) 40 CFR Section 300.430(f)(4)(ii), and considering EPA policy.

This is the sixth FYR for the Bayou Bonfouca Superfund site (the Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of two operable units (OUs). This FYR Report addresses both OUs. OU1 addresses the contamination source (soils and bayou sediments). OU2 addresses contaminated groundwater.

EPA remedial project manager (RPM) Casey Luckett Snyder led the FYR. Participants included EPA community involvement coordinator (CIC) Jason McKinney, Keith Horn of the Louisiana Department of Environmental Quality (LDEQ), and Kirby Webster and Kelly MacDonald from EPA FYR contractor Skeo. The review began on 7/14/2020.

Site Background

The 54-acre Site is located about 5 miles from the north shore of Lake Pontchartrain, in Slidell, Louisiana (Figure 1). From the late 1800s to the early 1970s, a commercial wood-treating (creosote) plant operated on site. In addition to releases of creosote during the plant's operation, several large tanks ruptured during a fire in the early 1970s, causing creosote to flow across the Site and into the bayou, contaminating soil, bayou, creek and channel bottom sediments, surface water and groundwater.

Current land uses surrounding the Site include commercial use to the east, a residential subdivision across the bayou to the southwest, residences and wooded areas to the west, and several residences and businesses along West Hall Avenue to the north. Current remedial features on site include a groundwater/dense non-aqueous phase liquid (DNAPL) extraction system, a groundwater treatment plant and a Resource Conservation and Recovery Act (RCRA) cap. In 1997, Braselman Corporation deeded the site property to the city of Slidell (City). The City's Public Works Department uses the eastern part of the Site and former site buildings for vehicle storage and maintenance. A city park known as Heritage Park is partially located on the southeastern portion of the Site. The park includes playgrounds, picnic areas, walking paths, restrooms and a gazebo for performances and community gatherings. The Slidell Municipal Marina opened south of the site property in the summer of 2018. It includes floating docks, piers, pedestrian pathways and other amenities to encourage recreational boating on the bayou.

Most of the Site is in the 100-year floodplain. The ground elevation is about 9 feet above mean sea level. Bayou Bonfouca is a navigable waterway that flows south from the Site about 7 miles to Lake Pontchartrain. The bayou is typical of area surface waters (i.e., tidal, typically low salinity waters with adjacent cypress swamps).

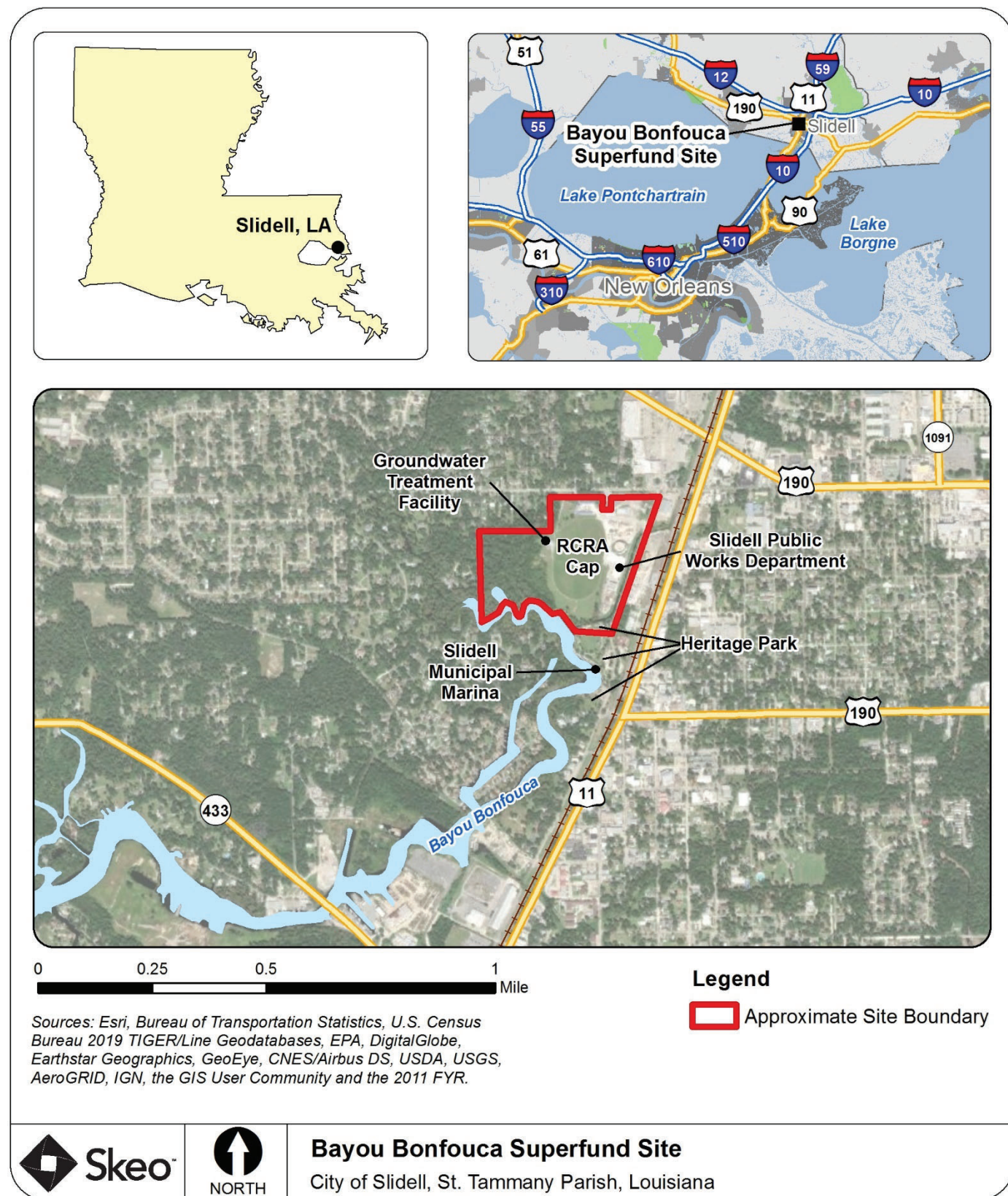
Three distinct water-bearing zones are identified at the Site: the surficial aquifer, the shallow artesian aquifer, and the deep artesian aquifer (located at about 50 feet below ground surface [bgs] and about 10 feet thick). Groundwater flow occurs through the shallow and deep artesian aquifers toward the bayou. The primary aquifer used for drinking water by the City is the Pontchatoula Aquifer, which occurs about 1,500 feet bgs. Area residents have access to potable water.

Appendix A lists the documents reviewed for this report. Appendix B provides a site chronology.

FIVE-YEAR REVIEW SUMMARY FORM

| SITE IDENTIFICATION | | |
|---|---|---|
| Site Name: Bayou Bonfouca | | |
| EPA ID: LAD980745632 | | |
| Region: 6 | State: Louisiana | City/County: Slidell/St. Tammany Parish |
| SITE STATUS | | |
| NPL Status: Final | | |
| Multiple OUs? Yes | Has the Site achieved construction completion? Yes | |
| REVIEW STATUS | | |
| Lead agency: EPA | | |
| Author name: Casey Luckett Snyder, with additional support provided by Skeo | | |
| Author affiliation: EPA Region 6 | | |
| Review period: 7/14/2020 – 6/30/2021 | | |
| Date of site inspection: 2/2/2021 | | |
| Type of review: Statutory | | |
| Review number: 6 | | |
| Triggering action date: 8/12/2016 | | |
| Due date (<i>five years after triggering action date</i>): 8/12/2021 | | |

Figure 1: Site Vicinity Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In response to an April 1976 media request, the U.S. Coast Guard began investigating creosote pollution of Bayou Bonfouca. Five area residents filed reports with the U.S. Coast Guard citing damage to boats from contact with oily substances in the bayou. Later in 1976, the local newspaper reported continuous discharges of creosote-derived oils into the bayou. Based on the contamination identified during U.S. Coast Guard investigations, EPA listed the Site on the Superfund program's National Priorities List (NPL) in September 1983.

During the remedial investigation, a stretch of the bayou about 1.5 miles long was found to be biologically sterile due to creosote contamination in sediments and the water column. The contamination was so severe that it caused second-degree burns to divers, injured or killed aquatic animals and waterfowl, and posed a significant recreational hazard. The areas of highest contamination were found in the on-site creosote deposits and in surface soils near the creosote waste deposits. An estimated 4,000-foot stretch of the bayou was contaminated. The maximum depth of contaminated sediments was 17 feet. The estimated total volume of contaminated sediments was 150,000 cubic yards.

The Site's 1986 remedial investigation identified the principal pollutants at the Site as polycyclic aromatic hydrocarbon (PAH) compounds associated with creosote. The contaminants of concern (COCs) were total PAHs. These constituents were identified in surface soils, on-site groundwater, off-site groundwater and bayou sediments. Appendix K includes a map of contaminated areas, as identified in the 1987 Record of Decision (ROD). DNAPLs were also identified in groundwater beneath the southern portion of the Site, beneath an eastern drainage channel and on the south side of the bayou under parts of a residential subdivision. The primary threats that the Site posed to public health and safety were direct contamination of groundwater supplies in the area, transportation of the on-site waste material into a navigable waterway during flooding, and potential for direct contact with the concentrated hazardous material located on an unsecured site.

Response Actions

The Site's RODs – signed by EPA in August 1985 and March 1987 – identified remedial action objectives (RAOs):

- Minimize public exposure to creosote contamination existing on the surface of the Site.
- Reduce the potential for continued contaminant releases to the bayou from waste existing on the surface of the Site.
- Mitigate the potential for contaminant migration due to site flooding.
- Minimize continuing contamination in the surficial and upper artesian aquifers at the Site.
- Close the Site in a manner that will minimize contaminant migration resulting from surface runoff, minimize surface water ponding and minimize continued contamination from the creosote constituents.
- Reduce or eliminate the potential for ingestion of carcinogens in groundwater, surface soils and shellfish.
- Control the migration of PAH contamination in the shallow artesian aquifer and other aquifers.
- Reduce or eliminate the direct contact threat posed by bayou sediments and on-site surficial creosote waste deposits.

The site remedy was divided into operable units in the 1990 Explanation of Significant Differences (ESD): OU1 addresses the contamination source (soil and bayou sediments) and OU2 addresses contaminated groundwater. The final remedy identified in the 1985 and 1987 RODs, as amended by the 1990 ESD and 1995 ROD Amendment, included:¹

- Incineration of creosote accumulations and contaminated sediments (bayou, creek and channel bottoms).

¹ The original 1985 ROD's remedy was changed from a cap-in-place remedy to the 1987 ROD's remedy that required excavation and on-site incineration of all heavily contaminated sediment and creosote waste piles.

- Excavation of sediment to ensure that source of groundwater contamination by creosote is mitigated and the threat to aquatic biota minimized.
- RCRA cap over excavated contaminated sediments and soil.
- Bulkheads and turbidity curtains for bayou dredging.
- Backfilling dredged areas with clean materials.
- Groundwater pumping and treatment.
- Use of the existing Bayou Bonfouca incinerator for treatment of the Southern Shipbuilding Corporation Superfund site material. Resulting incinerator ash taken back to the Southern Shipbuilding Corporation site.²

The 1987 ROD described that the groundwater process was to be designed to achieve applicable and relevant Federal and State standards and that the groundwater remediation would in essence be a pilot study. Table 1 lists site cleanup goals for PAHs. The ROD noted that until specific field data were collected, it was unknown what cleanup levels would be technologically achievable. Due to lack of specificity of the constituents described in Site decision documents and that the Site transitioned to the LDEQ assuming the role of lead site management of the operation and maintenance (O&M) activities in 2001, the current monitoring is conducted using Louisiana RECAP (Risk Evaluation/Corrective Action Program) Screening Standards and EPA Regional Screening Levels (RSLs), where appropriate.

Table 1: Cleanup Goals

| Contaminants | Groundwater Cleanup Goal (ng/L) | Sediment Cleanup Goal (mg/kg) | Soil Cleanup Goal (mg/kg) |
|---|------------------------------------|----------------------------------|------------------------------|
| Total PAHs ^a | 3.1 ^a | 1,300 ^b | 100 ^{c,d} |
| <p><i>Notes:</i></p> <p>a. From the 1987 ROD based on the 1987 Clean Water Act level. The ROD stated that until specific field data are collected it is unknown what cleanup levels will be technologically achievable. The target cleanup will be a health-based 10⁻⁴ or 10⁻⁶ level.</p> <p>b. From the 1987 ROD based on ecological risk, and re-evaluated in the 1990 ESD.</p> <p>c. From the 1987 ROD based on human health risk.</p> <p>d. The 1990 ESD re-evaluated ROD action levels, showing that the 1987 ROD action level of 100 mg/kg total PAHs for surface soils is equivalent to about 9 mg/kg carcinogenic PAHs.</p> <p>ng/L = nanograms per liter mg/kg = milligrams per kilogram</p> | | | |

Status of Implementation

OU1 – Source Control

From November 1993 to July 1995, EPA excavated and incinerated over 170,000 cubic yards of contaminated bayou sediments and creosote waste. The resultant ash and on-site contaminated soils were placed in a RCRA-compliant Subtitle C landfill on site. EPA also incinerated wastes from the nearby Southern Shipbuilding Corporation Superfund site, as described in the 1995 ROD Amendment. The incinerator was removed from the Site in December 1996 after operations finished at the Southern Shipbuilding Corporation site. EPA issued a Preliminary Close-Out Report for the site in September 1997.

In 2006, LDEQ contractors sampled sediment to determine possible impacts of Hurricane Katrina and Hurricane Rita storm surges on the remedy's protectiveness. Sampling identified total PAH concentrations between 1.5

² Per the 1995 ROD Amendment, section 104(d)(4) of CERCLA, 42 U.S.C. § 9604(d)(4), allows two or more noncontiguous facilities that are reasonably related on the basis of geography or on the basis of the threat or potential threat to the public health or welfare or the environment to be treated as one for the purpose of remediation. Because of the similarity of threats posed by the Bayou Bonfouca site wastes and the Southern Shipbuilding Corporation Superfund site wastes and because of the relative proximity of these sites, EPA determined that the two sites constitute one site for the purpose of conducting the selected remedy in the Southern Shipbuilding Corporation site ROD.

milligrams per kilogram (mg/kg) and 7 mg/kg in aquatic sediments and carcinogenic PAH concentrations in sediment between 0.09 mg/kg and 0.67 mg/kg. These values are well below the 1,300 mg/kg cleanup goal for sediments.

Additional sediment sampling was conducted in 2020, and in May 2020 the Louisiana Department of Health and LDEQ rescinded the swimming and sediment contact advisory after the 2020 sediment sampling showed that contamination remained below both the ROD cleanup goal of 1,300 mg/kg total PAHs and RECAP Screening Standards. The RECAP Screening Standards used for sediment comparison were those for non-industrial (residential) soils. These are intended to be protective of human health via direct contact in a residential setting. They are significantly more protective than the 1,300 mg/kg cleanup goal, as they are each based on unlimited use, a Hazard Index (HI) of <1, and a cancer risk of 1×10^{-6} .

OU2 – Groundwater

EPA began operation of the long-term remedial action for DNAPL in groundwater in July 1991. The objectives of the groundwater cleanup program are to recover the free-phase creosote product by extracting impacted groundwater at an optimal rate without inducing sediment subsidence. The pump-and-treat system consists of several components:

- Extraction well arrays 1a, 2 and 3 (44 total extraction wells) (see Figure 2).
- Treatment building, air compressor (for plant and recovery pumps), and control system for recovery and treatment system.
- Collection system and piping and underground conduits, including a subsurface pipeline and leak detection system to service new extraction wells, and an underground pipeline extending across Bayou Bonfouca, complete with a leak detection sensor for fluid and air conveyance.
- Groundwater and free-phase treatment system (chelating agent, oil/water separator, solids removal filters, organic removal filter and associated tankage).

The original on-site groundwater remediation system included two networks of extraction wells – Array 1 (in the former plant operations area) and Array 2 (parallel to the former eastern drainage channel), installed in July 1991. A third array was installed in 2000 to address contamination in the off-site area beneath the residential neighborhood on the west side of the bayou. The three extraction arrays are detailed below and shown in Figure 2. All three well arrays pump from the shallow artesian aquifer.

- Array 1 and 1a
 - The Array 1 network was located in the RCRA landfill area where source removal was required. Array 1 wells were removed during the soil remedial action in 1993.
 - The Array 1a network, which consists of 12 extraction wells around the southwestern perimeter of the landfill, was installed in 2000 to take the place of Array 1. Array 1a is located downgradient of the creosote plume, beneath the on-site landfill.
- Array 2
 - The Array 2 network consists of 22 extraction wells and six subsidence wells. Array 2 is located along the former eastern drainage channel.
- Array 3
 - The Array 3 network consists of 10 extraction wells and five additional off-site subsidence monitoring wells (located off site on private property in the residential neighborhood on the west side of the bayou). Array 3 was installed to capture recoverable free-phase creosote and dissolved-phase contaminants in the off-site area beneath the residential neighborhood, on the west side of the bayou.

Well installation and groundwater treatment plant upgrades reached completion in 2000. The treatment plant currently discharges to Bayou Bonfouca. Per the 2012 O&M Plan, the discharge has to meet National Pollutant Discharge Elimination System (NPDES) regulations and effluent limitations set by the LDEQ (these are listed in the 2012 O&M Plan). The separated DNAPL is stored on site and then disposed of as a hazardous waste off site. The state of Louisiana assumed responsibility for O&M activities at the Site in July 2001.

The groundwater treatment system continues to operate and recover contaminated groundwater from the three arrays. Currently, about 700 gallons of DNAPL are recovered each year. Additional observation/sentinel wells are monitored during recovery operations to ensure that drawdown does not exceed 4 feet and cause subsidence in the vicinity of the treatment area.

The 2016 FYR Report identified as an issue that groundwater cleanup goals had not been met for the Site with the current remedy and were unlikely to be met in an acceptable timeframe. The report recommended an optimization review of the remedy. In 2018, EPA completed an optimization review that included recommendations focused on opportunities for optimization as related to protectiveness, cost effectiveness, site closure, technical improvements and efficient use of resources at the Site.

Also, as a result of recommendations in the 2016 FYR and the 2018 optimization review, an LDEQ contractor conducted site investigations to evaluate the current extent of the subsurface DNAPL and current soil and groundwater COC concentrations, in March and November 2018. The contractor summarized its findings in a June 2019 LDEQ RECAP Report. See the data review section of this FYR for more information.

Figure 2: Detailed Site Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Institutional Control (IC) Review

The decision documents do not require institutional controls; however, they are needed to ensure protectiveness. Table 2 below summarizes the status of site institutional controls, including for which media institutional controls are needed. Institutional controls are currently in place via a 2008 Conveyance Notification, which identifies the property as a Superfund site with hazardous constituents in soil and groundwater above levels that allow for unrestricted exposure. The notification states that the property is suitable for industrial/commercial use, and if land use changes to a non-industrial use, the property owner should notify LDEQ within 30 days to determine whether that land use is appropriate. The notification also prohibits disturbance or destruction of any remedial elements and prohibits removing soil or groundwater from the Site. Appendix J includes the 2008 Conveyance Notification in full. Figure 3 shows the approximate location of the conveyance and the location of source material from 1997.

In 1987, the Louisiana Department of Health, LDEQ and the Louisiana Department of Wildlife and Fisheries issued a fish consumption, swimming and sediment contact advisory as a precautionary measure to protect public health during site remediation. After a comprehensive evaluation of fish tissue data collected in 1996 and 1997, the advisory was updated in December 1998 to remove the warning about consuming fish while leaving the swimming and sediment contact advisory in place. In May 2020, the Louisiana Department of Health and LDEQ rescinded the swimming and sediment contact advisory after sediment sampling in 2020 showed contamination was below the ROD cleanup goal and LDEQ RECAP Screening Standards. This marks only the second time in State history that a contact advisory has been rescinded and demonstrates the effectiveness of the remedy in restoring the bayou.

Groundwater contamination is present off-site and outside of the area, under the 2008 Conveyance Notification. The City of Slidell has a City Ordinance in place that requires property owners connect to the city water supply within city limits, which covers off-site properties in Slidell (Chapter 28, Article II. Division 1. Sec. 28-21).³ However, as seen in Figure 3, there is off-site groundwater contamination under the residential area across the bayou, which is located within St. Tammany Parish but outside of the city of Slidell. Discussions are ongoing about appropriate avenues to prevent groundwater use on the residential properties near Array 3.

In addition, during 2018 site investigations, one sample indicated contamination in surface soil in Heritage Park, in excess of RECAP limiting standards and EPA RSLs. The Park Property was owned by Braselman Corporation and donated to the City; however, no remedial action occurred on most of the Park Property. Therefore, there are no institutional controls for the majority of the Park. Delineation of the shallow contamination found in Heritage Park is part of the upcoming Site investigation. Options for engineering controls, institutional controls or removal of contaminated shallow soils will be evaluated at that time.

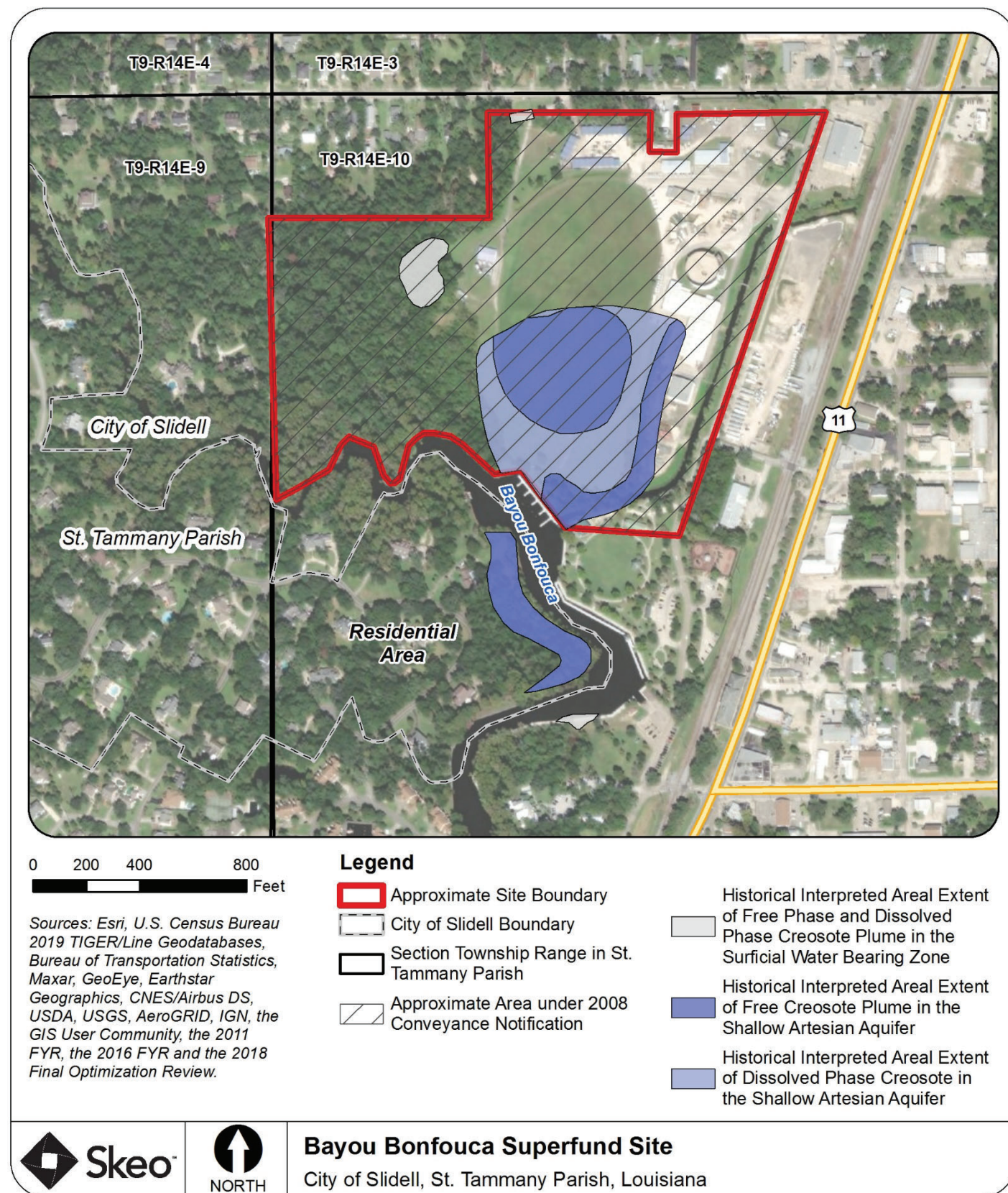
In addition, during 2018 site investigations one sample indicated contamination in the residential area in excess of RECAP limiting standards and EPA RSLs. Delineation of the shallow contamination found in Heritage Park and the residential area is part of the upcoming Site investigation. Options for engineering controls, institutional controls or removal of contaminated shallow soils will be evaluated at that time.

³ All persons, or the duly constituted agents thereof, owning improved real property in the city, shall, upon written notice, within ten days connect their property with the waterworks system of the city, where such waterworks system is within 300 feet of the property line. Located at: https://library.municode.com/la/slidel/codes/code_of_ordinances?nodeId=PTIICOOR_CH28UT_ARTIIWA, accessed 4/5/2021.

Table 2: Summary of Planned and/or Implemented Institutional Controls (ICs)

| Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions | ICs Needed | ICs Called for in the Decision Documents | Impacted Parcel(s) | IC Objective | Title of IC Instrument Implemented and Date (or planned) |
|--|-------------------|---|--|---|---|
| On-site soil and groundwater | Yes | No | See Figure 3 | Prevent non-industrial land use. Prevent contact with contaminated soil or groundwater. Prevent damage or disturbance to remedial elements. | 2008 Conveyance Notification (#1680636) |
| Off-site groundwater | Yes | No | Off-site groundwater contamination within Slidell | Restrict use of contaminated groundwater. | City of Slidell Ordinance (Sec. 28-21 of City Code) |
| Off-site groundwater | Yes | No | Off-site groundwater contamination outside of Slidell near Array 3 | Restrict use of contaminated groundwater. | None |

Figure 3: Institutional Control Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Systems Operations/Operation and Maintenance (O&M)

The U.S. EPA, under CERCLA, was the administrator of the Bayou Bonfouca Superfund Site during the remedial action. The site transitioned to O&M with the LDEQ assuming the role of lead site management of the O&M activities in 2001. O&M is conducted under the September 2012 O&M Plan. Monthly operational reports are prepared and submitted. The 2012 O&M Plan includes requirements for general inspection and maintenance of the site, RCRA cap, groundwater treatment building, groundwater treatment plant, and well vaults.

OU1

The O&M Plan requires the cap to be inspected monthly for signs of erosion or vegetation growth. Details of the cap inspection are included in the monthly reports. No issues were found during the review period. The grass at the site is mowed once a month or as needed. No shrubs or trees are allowed to grow on the cap. In May 2018, the City installed a fence along the bulkhead at the bayou to eliminate access to the Site from the marina.

OU2

O&M activities at the Site include:

- Pumping and treating liquids from recovery wells in the arrays.
- Maintaining site grounds and equipment, including severe weather protection.
- Operating the treatment plant.
- Collecting DNAPL.
- Monitoring and maintaining/preventing subsidence in the arrays.
- Monitoring of MW-1, MW-2, SM-3 and SM-8 for SVOCs on a semi-annual basis.

Monthly sampling and laboratory analysis are performed for the following treatment system components:

- Inlet to oil/water separator.
- Inlet to the sand filter.
- Inlet to oleophilic filter.
- Inlet to carbon filters.
- Next-to-last carbon filter vessel with 80% carbon bed depth.
- Effluent discharge water.
 - While the Site does not require a NPDES permit, it does have to meet NPDES regulations and effluent limitations assigned by the LDEQ (these are listed in the 2012 O&M Plan).

During the last five years, the treatment plant was generally operational. Plant shutdowns temporarily occurred due to freezing temperatures, site investigations, tropical storms/hurricanes, flooding/storm surges, a nearby festival in Heritage Park (May 2018), fireworks displays from the cap (June and July 2018), and a transition to a new O&M contractor (June 2019).

The treatment system's O&M contractor routinely removes the pumps from the recovery wells for cleaning and servicing. Pumps in six Array 2 recovery wells were irretrievable due to degradation of the well screens and subsequent sand intrusion into the well. From May to July 2020, LDEQ contractors replaced recovery wells and their associated pumps and equipment.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the previous FYR Report, as well as the recommendations from the previous FYR Report and the status of those recommendations.

Table 3: Protectiveness Determinations/Statements from the 2016 FYR Report

| OU # | Protectiveness Determination | Protectiveness Statement |
|----------|------------------------------|--|
| 1 | Short-term Protective | The OU1 remedy currently protects human health and the environment because there are no completed exposure pathways. However, in order for the remedy to be protective in the long term, EPA should evaluate the need to include institutional controls already in place on the landfill in a site decision document to ensure protectiveness. |
| 2 | Short-term Protective | The OU2 remedy currently protects human health and the environment because there are no completed exposure pathways. For the remedy to be protective over the long term: groundwater use restrictions need to be implemented above the southwestern groundwater plume and EPA should evaluate the need to include institutional controls in an appropriate decision document; subsidence monitoring well SM-5 needs to be replaced; the groundwater site plume map should be updated; the applicability of EPA's 2015 vapor intrusion guidance needs to be evaluated; and the groundwater remedy should be optimized to assess the effectiveness of the remedy and identify a potential exit strategy for the Site. |
| Sitewide | Short-term Protective | The remedy currently protects human health and the environment because there are no completed exposure pathways. For the remedy to be protective over the long term: groundwater use restrictions need to be implemented above the southwestern groundwater plume and EPA should evaluate the need to include institutional controls for the landfill and groundwater in an appropriate decision document; subsidence monitoring well SM-5 needs to be replaced; the groundwater site plume map should be updated; the applicability of EPA's 2015 vapor intrusion guidance needs to be evaluated; and the groundwater remedy should be optimized to assess the effectiveness of the remedy and identify a potential exit strategy for the Site. |

Table 4: Status of Recommendations from the 2016 FYR Report

| OU # | Issue | Recommendations | Current Status | Current Implementation Status Description | Completion Date (if applicable) |
|-------|---|---|------------------|---|---------------------------------|
| 1 & 2 | Institutional controls are in place for the landfill and are necessary to ensure the protectiveness of the remedy. There are no current groundwater restrictions on private property above the southwestern groundwater plume. No institutional controls are included in site decision documents. | Initiate discussions with the City of Slidell regarding the need for a City ordinance to restrict construction of private water wells above the southwestern groundwater plume. Evaluate the need to include institutional controls for the landfill and the groundwater in an appropriate decision document. | Under Discussion | Discussions are ongoing about appropriate avenues to restrict groundwater use on the residential properties near Array 3. EPA is considering the need for decision documents to require institutional controls. | N/A |
| 2 | Subsidence monitoring well SM-5 located within the City of Slidell Public Works maintenance yard was inadvertently destroyed in 2015. | Replace subsidence monitoring well SM-5. Ensure wells are labeled acknowledging use as part of the Superfund site. | Completed | SM-5 was plugged and abandoned. A new well, SM5-R1 was installed on March 29, 2017. It is labeled. | 3/29/2017 |
| 2 | The extent of the contaminated groundwater plume needs to be updated. | Determine data needs and necessary monitoring and update site plume maps. | Ongoing | Investigations in 2018 indicated a portion of the DNAPL plume is potentially circumventing the southwest end of Array 2 and the northern portion of Array 3. Investigations are underway to further delineate DNAPL and | N/A |

| OU # | Issue | Recommendations | Current Status | Current Implementation Status Description | Completion Date (if applicable) |
|------|--|--|----------------|---|---------------------------------|
| | | | | dissolved groundwater contamination. | |
| 2 | Based on current knowledge of groundwater contamination, it is unclear if the vapor intrusion pathway needs to be further evaluated. | Using data collected and the updated plume maps, evaluate the need for a vapor intrusion evaluation per EPA's 2015 vapor intrusion guidance. | Ongoing | LDEQ investigated on-site vapor intrusion in the June 2019 RECAP report, which indicated that this exposure pathway does not present a current concern for existing enclosed structures. However, EPA's vapor intrusion evaluation indicated further vapor intrusion evaluation in the residential area is appropriate. | N/A |
| 2 | Groundwater cleanup goals have not been met and are unlikely to be met in an acceptable timeframe. | Perform an optimization of the Site. The optimization should assess the effectiveness of the groundwater remedy and identify a potential exit strategy for the Site. | Completed | EPA completed an optimization review in 2018. It provided recommendations on optimization and site closure. EPA's Environmental Response Team (ERT) is conducting a supplemental remedial investigation for DNAPL plume delineation and will test or recommend potential enhancements for DNAPL capture. | 11/28/2018 |

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was made available by newspaper posting in *The Advocate* on 9/11/2020 (Appendix C). It stated that the FYR was underway and invited the public to submit any comments to EPA. The results of the review and the report will be made available at the Site's information repository, St. Tammany Parish Public Library – Slidell Branch, located at 555 Robert Boulevard in Slidell, Louisiana and on the site website.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy implemented to date. The interviews are summarized below.

Keith Horn of LDEQ said that the sediment and soil remedies have been very successful, but the groundwater remedy does not appear able to meet remedial goals using pump-and-treat methods. He noted that the groundwater remedy could be modified to focus on phase recovery or to be a containment-only remedy. Mr. Horn said LDEQ has been very involved with the Site over the last five years, including conducting O&M activities and operating the groundwater treatment system, as well as evaluating the potential for vapor intrusion and investigating contamination in sediments, groundwater, and soil. He noted that institutional controls are needed off site. EPA has initiated discussions with the city of Slidell and St. Tammany Parish regarding these controls, but none have been implemented yet. He stated that institutional controls are needed on the private property on the southwest side of the bayou and at Heritage Park. Mr. Horn noted that site reuse has been successful, with a portion on the former property being converted into Slidell's Heritage Park, which is a community asset, and another portion of the Site being converted to the Slidell Public Works facility. He also said that in August 2017, the Slidell Department of Public Works cleared some trees along the outside of the facility fence on West Hall Street, causing residents to complain to EPA and LDEQ. EPA met with the residents and discussed these concerns, and the city of Slidell subsequently ceased clearing operations and plans to develop a parking facility at that location.

Rick Tibbs, O&M contractor, noted that the cleanup is taking place as designed. He shared that maintenance is an ongoing challenge, as the system is old and outdated. Though the equipment is old, he noted that LDEQ has been

great in repairing, replacing, and upgrading the equipment. Mr. Tibbs commented that monitoring data indicates contamination is being recovered. He said that there are two on-site operators at the Site daily who oversee O&M and troubleshoot as needed. He did not report any significant changes to the O&M in the last five years.

Slidell City Engineer Blaine Clancy was aware of the former environmental issues at the Site and felt well informed about site progress. He noted that there have been no issues with trespassing or vandalism at the Site, and no changes to local regulations have occurred that might impact remedy protectiveness. He was not aware of any projected land use changes. He said that EPA and LDEQ have done a fantastic job regarding the project, and the agencies' willingness to work with the local government has proved beneficial to the overall project.

A private resident who lives near the Site was also interviewed. She noted that the maintenance of the landfill property all looks good and is mowed regularly. She shared that people enjoy the park, and she does not know of any site-related effects on the surrounding community. She was not aware of any trespassing or vandalism. She feels self-informed about the Site, but she noted that EPA has been very responsive to her and provides information as requested. She thought an open house might be well-received by the community. She noted that she smells what may be creosote occasionally but did not state that she thought it was specifically site related.

Data Review

The goal of the groundwater recovery system is to extract dissolved and free-phase creosote oil from the shallow artesian aquifer and prevent land surface subsidence. Subsidence is controlled by limiting the water level drawdown in the shallow artesian aquifer. Groundwater remediation began in 1991, and the treatment system is still in operation. When operational, the system reportedly removes about 10 gallons per minute of groundwater and about 50-75 gallons of DNAPL per month. As documented in the 2018 optimization review, based on current DNAPL recovery rates it appears that DNAPL recovery effectiveness has decreased over time, as most of the mobile, recoverable DNAPL has been removed. EPA is conducting supplemental investigations to evaluate potential modifications and/or remedial approaches to enhance capture of DNAPL and contaminated groundwater.

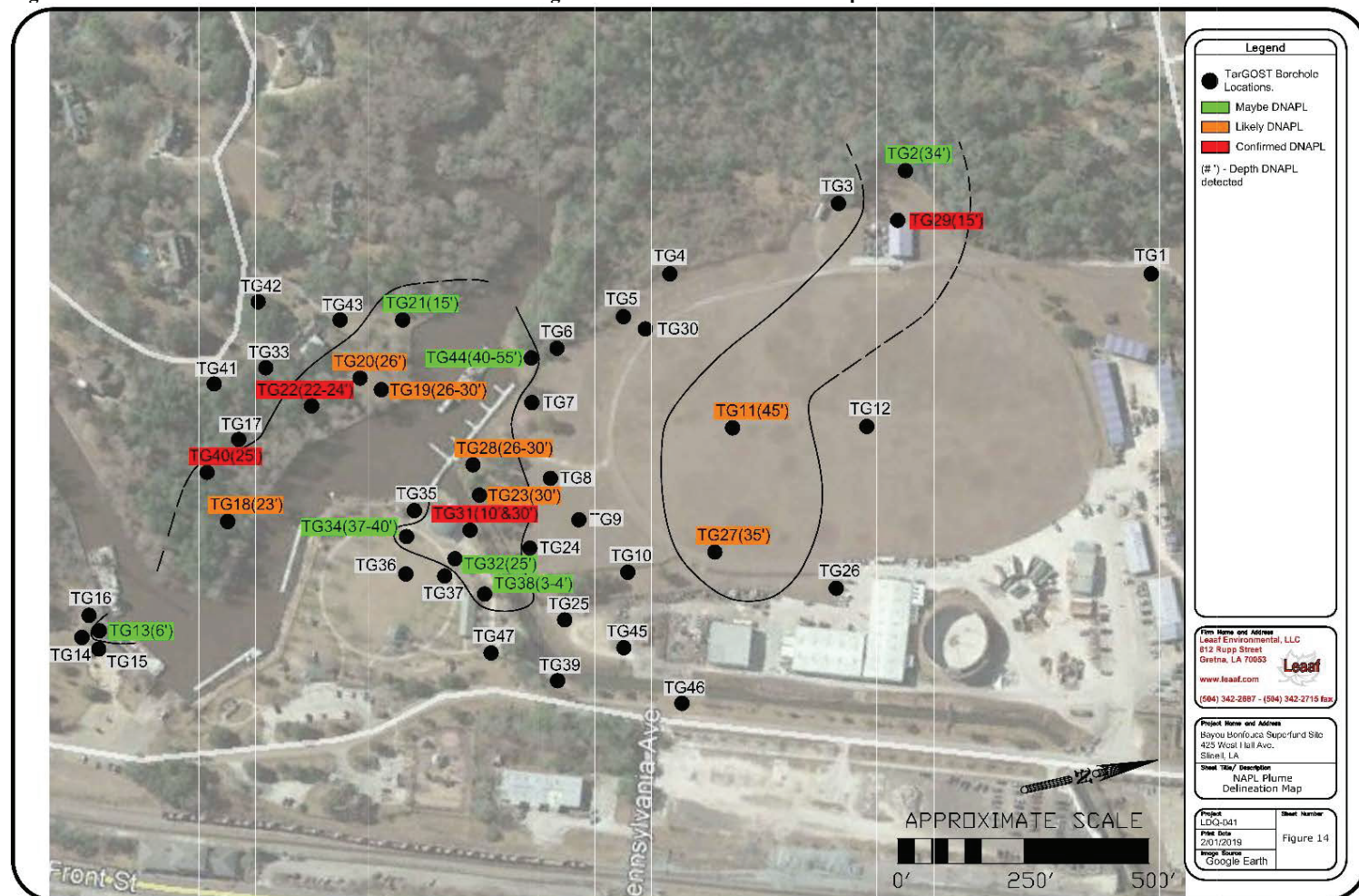
The 1987 ROD described that the groundwater process was to be designed to achieve applicable and relevant Federal and State standards and that the groundwater remediation would in essence be a pilot study. The 1987 ROD identified site cleanup goals for total PAHs for groundwater, soil and sediment. The ROD noted that until specific field data were collected, it was unknown what cleanup levels would be technologically achievable. Due to lack of specificity of the constituents described in Site decision documents and that the Site transitioned to the LDEQ assuming the role of lead site management of the O&M activities in 2001, the current monitoring is conducted using Louisiana RECAP Screening Standards and EPA RSLs, where appropriate.

Contamination Delineation

In March and November 2018, an LDEQ contractor conducted site investigations to evaluate the current extent of the subsurface DNAPL and current soil and groundwater contaminant concentrations. The contractor summarized its findings in a June 2019 Risk Evaluation/Corrective Action Program (RECAP) Report. Landfill ash was characterized for future evaluation of potential uses. The investigation included a field screening for the presence of DNAPL using TarGOST (a downhole-borehole DNAPL screening technology).

The 2018 investigations confirmed that subsurface DNAPL is present under the southern portion of the on-site landfill, northwest of the on-site operations building, in the northern portion of Heritage Park, and in the vicinity of Array 3 on the west bank of Bayou Bonfouca. The 2018 investigation indicated a portion of the DNAPL plume potentially circumvents the southwest end of Array 2 and the northern portion of Array 3. The DNAPL plume has not been fully delineated in the western part of the Site. Figure 4 shows the locations of DNAPL identified during this investigation. EPA and LDEQ are continuing to conduct field screening and sampling to fully delineate the remaining DNAPL and evaluate remedial approaches to address it.

Figure 4: DNAPL Delineation from the June 2019 Site Investigation and RECAP Evaluation Report



Concentrations of PAHs in surface soil, subsurface soil and groundwater are present in excess of RECAP limiting standards, including the enclosed space standards (Appendix F, Figures F-3, F-4 and F-5), and in some cases EPA regional screening levels (RSLs). The 2018 investigations were designed to delineate the DNAPL plume. The limited soil and groundwater sampling did not fully delineate the contaminants in soil and dissolved in groundwater. Based on the data and calculations in the June 2019 RECAP Final Report, the following actions were recommended:

- Delineate the DNAPL on the western part of the Site.
- Consider developing a plan to remove or restrict the dissolution of remaining DNAPL.
- Remediate or restrict access via institutional controls to the contaminants in soil and groundwater that exceed RECAP limiting standards (since this was a RECAP report, the recommendations were based on RECAP standards).
- Annual monitoring of groundwater for semi-volatile organic compounds (SVOCs) and hydrocarbon fractions.

Publicly accessible surface soil contamination found during these investigations was evaluated during this FYR using EPA's RSLs. One sample was in a recreational area, and one was in a residential area. Even though the residential sample exceeded the state's residential screening level, the sample corresponded to acceptable risk under a residential scenario when applying EPA's RSLs. The sample in the recreational area corresponded to acceptable risk under an industrial scenario, but not under a residential scenario, when applying EPA's RSLs. However, the residential exposure assumptions are highly conservative for use in a recreational area so it is unlikely recreational users of the Site are experiencing residential exposure duration and frequency. See Appendix H, Tables H-5 and H-6 for more information. Delineation of the shallow contamination found in Heritage Park and the residential area is part of the upcoming Site investigation activities. Options for engineering controls, institutional controls or removal of contaminated shallow soils will be evaluated at that time.

Groundwater Monitoring

Groundwater is sampled semiannually, and well locations are shown in Figure 2. Groundwater monitoring data from February and October 2020 are included in Figure F-6 of Appendix F. Groundwater samples are analyzed for SVOCs in four wells (MW-1, MW-2, SM-3 and SM-8). During this FYR period, there were no detections of any SVOCs sampled in wells SM-3 and SM-8. Table 5 below lists detections from wells MW-1 and MW-2. Groundwater monitoring reports do not compare groundwater data to standards, so for this FYR the data are compared to EPA's tap water RSLs. The only contaminant to exceed EPA's tap water RSLs was naphthalene in both MW-1 and MW-2. Naphthalene exceedances were also found in MW-1 and MW-2 in the previous FYR period. Overall, the extent of the SVOC contamination at the Site emanating from the DNAPL sources is not clear. There have been no detections of SVOCs during the two most recent sampling events; however, the detection limit is greater than the EPA RSL for naphthalene.

Table 5: Groundwater Monitoring Data during this FYR Period for Detected Contaminants

| Monitoring Well | Contaminant | EPA Tap Water RSL (µg/L) | | Concentration (µg/L) | | | | | | |
|---|--------------|---------------------------|--------|----------------------|-------------|------------|-------------|------------|--------|---------|
| | | 1 x 10 ⁻⁶ Risk | HQ = 1 | 6/2017 | 10/2017 | 4/2018 | 10/2018 | 4/2019 | 2/2020 | 10/2020 |
| MW-1 | Acenaphthene | - | 530 | 29.3 | 14.1 | 17.1 | <10 | 11.0 | <10 | <10 |
| | Naphthalene | 0.12 | 6.1 | 1,210 | 293 | 296 | 207 | 117 | <10 | <10 |
| | Fluorene | - | 290 | 11.9 | 6.1 | <10 | <10 | <9.4 | <10 | <10 |
| MW-2 | Acenaphthene | - | 530 | <10 | <10 | 14.6 | <10 | <9.2 | <10 | <10 |
| | Naphthalene | 0.12 | 6.1 | <10 | 16.4 | 422 | 12.1 | <9.2 | <10 | <10 |
| <i>Notes:</i> <i>Sources:</i> The June 2019, September 2020 and November 2020 Monthly Operational Reports. November 2020 RSLs accessed on 11/30/2020 at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables . - = RSL for carcinogenic risk not available. < = less than the laboratory detection limit. Bold = exceedance of RSL. µg/L = micrograms per liter. | | | | | | | | | | |

Subsidence Monitoring

To prevent subsidence, the monitoring wells are checked monthly to verify that allowable drawdown (<4 feet) and minimum groundwater elevations (>-4.0 feet mean sea level) are generally maintained. The most recent subsidence top-of-casing settlement survey took place in September 2010. Prior to this survey, the last survey record found was from September 2001. During this FYR period, the allowable drawdown and minimum groundwater elevations exceeded the 4 feet and -4 feet mean sea level parameters in SM-8 (September 2020 Monthly Operational Report). Because there has not been a top-of-casing settlement survey since 2010, the effects of the increased drawdown on subsidence in this area of the Site cannot currently be evaluated. The 2012 O&M Plan calls for periodic resurveys as part of the subsidence monitoring program. As part of LDEQ O&M activities, evaluate whether continued top-of-casing surveys are necessary to evaluate subsidence.

Effluent Monitoring

Effluent discharge water is sampled quarterly and analyzed for volatile organic compounds (VOCs) and SVOCs and compared to the effluent discharge limitations identified in the 2012 O&M Plan. There were no exceedances of effluent discharge limitations during this FYR period (Appendix F, Figure F-7 and Figure F-8). The September 2020 O&M Report stated that the acceptable effluent discharge water concentrations indicated the carbon treatment was effective and carbon replacement was not necessary at this time.

Sediment

In 2020, an LDEQ contractor conducted a limited sediment site investigation to evaluate current concentrations of sediment COCs in Bayou Bonfouca. Concentrations of SVOCs in the sampled sediments were below both the 1,300 mg/kg ROD cleanup goal for total PAHs and below RECAP non-industrial screening standards, indicating that there is minimal, if any, dissolved phase transmission between the onsite groundwater and bayou sediments and surface water. Each individual PAH has a LDEQ RECAP screening standard. The non-industrial standards are intended to be protective of human health via direct contact in a residential setting. They are significantly more protective than the 1,300 mg/kg cleanup goal since they are based on unlimited use, a Hazard Index of <1 and a cancer risk of 1 x 10⁻⁶.⁴ The LDEQ contractor recommended no further investigation. EPA reviewed and agreed that removing the advisory is protective and appropriate. Appendix F, Figure F-1 and Figure F-2 show the sediment sample locations and contaminants detected at each location. In May 2020, the Louisiana Department of Health and LDEQ rescinded the swimming and sediment contact advisory.

⁴ Further information on the LDEQ RECAP Regulation can be found at: <https://www.deq.louisiana.gov/page/recap>

Site Inspection

The site inspection took place on 2/2/2021. Participants included Keith Horn, LDEQ, Rick Tibbs and Daren McKenzie, LDEQ's site O&M contractors with Southern Environmental Management and Specialties Inc. (SEMS) and Eric Marsh, EPA FYR contractor Skeo. The purpose of the inspection was to assess the protectiveness of the remedy. The site inspection checklist and the site inspection photographs are available in Appendices D and E, respectively.

Participants viewed the groundwater treatment plant. The operators provided an overview of the treatment plant operations and then led an inspection of the treatment plant equipment and the operations control center. The components of the treatment system appeared to be in good condition.

Participants walked the landfill. Passive gas vents located at the top of the landfill as well as landfill drains at the perimeter of the landfill were identified. The landfill cap appeared to be in good condition. Participants observed on-site recovery well Array 2 just east of the landfill. The SEMS contractors identified the replacement recovery wells that had recently been installed. Recovery wells appeared to be in good condition. Site fencing near the landfill and the Site's main entrance were in good condition.

Site inspection participants observed the marina installed adjacent to the Site in 2017 and 2018. SEMS contractors pointed out the area where the underground pipeline extends from the treatment plant to Array 3 across the bayou. Participants observed the nearby pump box as well as the nearby treatment plant discharge pipe actively discharging treated water into the bayou. Participants also observed the sheet piling extending along the eastern and western banks of the bayou where sediment remediation had been completed. Participants viewed one of the 2018 soil sampling locations near the dock (TG44/LB11). Participants then observed on-site recovery well Array 1A near the southwestern edge of the landfill. Recovery wells appeared to be in good condition. Participants also observed monitoring well SM-3 north of the treatment plant building and monitoring wells MW-1 and MW-2 southwest of Array 1A. Wells were capped, locked and in good condition.

Participants then observed SM5-R1, the replacement subsidence monitoring well for SM-5 that had been damaged in 2015. The well was capped, locked and in good condition, but it was not labeled. [LDEQ labeled the well subsequent to the Site inspection, see photos in Appendix E.] Participants also viewed the former eastern drainage channel located east of the Slidell Public Works Department. Participants observed one of the November 2018 soil sampling locations near the drainage channel (TG46/LB9) as well as approximate sediment sampling locations. Participants also observed nearby SM-8, which was locked and secured. Participants then viewed Heritage Park, including parts of the park that fall within the site boundary. These areas appeared in good condition. Participants then observed Array 3 and the locations of the Array 3 recovery wells. Participants then went to the far western edge of the Site along St. Tammany Avenue and observed site fencing, which appeared to be in good condition.

On April 8, 2021, Skeo called the site repository located at St. Tammany Parish Public Library – Slidell Branch. The librarian located documents related to the Site.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Certain remedy components are functioning as intended; however, overall, the Site groundwater remedy is not functioning as intended, and the current remedy is not expected to meet RAOs. Contaminated sediments and creosote were excavated, incinerated and placed in an on-site landfill. Recent sediment sampling in Bayou Bonfouca for site COCs and LDEQ RECAP SVOCs were below both the 1,300 ppm ROD standard for total PAHs and below RECAP non-industrial screening standards. These results indicate that there is minimal, if any,

dissolved phase transmission between the onsite groundwater and bayou sediments and surface water. The cap is regularly inspected and is in good condition. Groundwater extraction, treatment and monitoring are ongoing.

The 1987 ROD described that the groundwater treatment process was to be designed to achieve applicable and relevant Federal and State standards and that the groundwater remediation would in essence be a pilot study. Until specific field data were collected, it was unknown what cleanup levels would be technologically achievable. The 2016 FYR Report identified as an issue that groundwater cleanup goals had not been met for the Site with the current remedy and would unlikely be met in an acceptable timeframe. Subsequent remedial investigations indicated a portion of the DNAPL plume is potentially circumventing the southwest end of Array 2 and the northern portion of Array 3. EPA plans to evaluate various remedial approaches which could contain or reduce the extent of DNAPL and groundwater contamination. Based on site investigations performed since the previous FYR, EPA is evaluating whether the groundwater pump and treat system is functioning as expected to contain contaminated groundwater and if the system is likely to achieve restoration within a reasonable timeframe. Current data indicate it is functioning more as a containment remedy than a restoration remedy and will not likely achieve applicable and relevant Federal and State standards, though the plume is not fully delineated.

The DNAPL source plume has not been fully delineated. Overall, the extent of the SVOC groundwater contamination at the Site emanating from the DNAPL sources is not clear and requires delineation. Few monitoring wells are sampled at the Site, and downgradient wells (MW-1 and MW-2) have tap water RSL exceedances showing that dissolved contaminant plume migration is occurring toward the bayou. A review of the Louisiana Department of Natural Resources GIS database indicates that there are no shallow, domestic wells located downgradient of the Site, indicating that there is no identified current exposure pathway for groundwater.⁵ Area residents have access to potable water. Additionally, recent sediment sampling conducted in 2020 confirmed that contaminants were not present in sediments above acceptable levels.

Institutional controls are in place via the 2008 Conveyance Notification, which states that the property is suitable for industrial/commercial use and if land use changes to a non-industrial use, the property owner should notify LDEQ within 30 days to determine whether that land use is appropriate. The notification also prohibits disturbance or destruction of any remedial elements and prohibits removing soil or groundwater from the Site. The decision documents did not require institutional controls; however these institutional controls are required for protectiveness. The City of Slidell has a City Ordinance in place that requires property owners connect to the city water supply within city limits, which covers off-site properties in Slidell. However, there is off-site groundwater contamination under the residential area across the bayou, which is located in St. Tammany Parish, outside of Slidell. A review of the Louisiana Department of Natural Resources GIS database indicates that there are no shallow, domestic wells located downgradient of the Site, indicating that there is no identified current exposure pathway for groundwater. Discussions are ongoing about appropriate avenues to restrict groundwater use on the residential properties near Array 3.

Per the 2018 site investigations, concentrations of contaminants in the surface soil and subsurface soil were present in excess of RECAP limiting standards and EPA RSLs. The investigations were designed to delineate the DNAPL plume; the limited soil sampling did not fully delineate soil contamination. Additional data collection in these areas is planned. Options for engineering controls, institutional controls or removal of contaminated shallow soils will be evaluated at that time.

During this FYR period, subsidence monitoring data showed that the allowable drawdown and minimum groundwater elevations exceeded their parameters in SM-8 (in September 2020). Because there has not been a top-of-casing settlement survey since 2010, the effects of the increased drawdown on subsidence in this area of the Site cannot currently be evaluated. The 2012 O&M Plan calls for periodic resurveys as part of the subsidence monitoring program. As part of LDEQ O&M activities, an evaluation is appropriate to determine whether continued top-of-casing surveys are necessary to evaluate subsidence, given technical analysis conducted as part of the 2018 optimization review.

⁵ Accessed 12/22/2020 at <http://sonris-www.dnr.state.la.us/gis/agsweb/IE/JSViewer/index.html?TemplateID=181> and <http://sonris-www.dnr.state.la.us/gis/dnld/download.html>.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

Question B Summary:

The current remedy is not expected to meet RAOs, though the 1987 ROD identified that it was unknown what cleanup levels will be technologically achievable by the groundwater remedy. Investigations are underway to enhance the groundwater remedy functionality and/or evaluate potential alternative groundwater approaches that may be utilized solely or in combination with the groundwater pump and treat system to address DNAPL and groundwater contamination at the Site.

Groundwater Applicable or Relevant and Appropriate Requirements (ARARs) were reviewed during this FYR to determine whether the groundwater cleanup goal remains valid (Appendix G). The maximum contaminant level (MCL) is less stringent for PAHs than the ROD cleanup goal, indicating that the cleanup goal remains valid. A screening-level risk assessment was conducted during this FYR to determine whether the soil cleanup goal remains valid (Appendix H). The cleanup goal remains valid for industrial use.

However, during recent site investigations, a potential exposure pathway was identified when a sample in a recreational area, Heritage Park, corresponded to acceptable risk under an industrial scenario, but not under a residential scenario, when applying EPA's RSLs. However, the residential exposure assumptions are highly conservative for use in a recreational area so it is unlikely recreational users of the Site are experiencing residential exposure duration and frequency. See Appendix H, Tables H-5 and H-6 for more information.

Due to the presence of VOCs in the subsurface soil and groundwater, LDEQ completed a vapor intrusion evaluation in June 2019 to address EPA's vapor intrusion concerns raised in the previous FYR. The results of the vapor intrusion evaluation demonstrated that this exposure pathway does not present a current concern for existing residential enclosed structures (Appendix H). Using the 2015 EPA vapor intrusion guidance, EPA conducted an evaluation using EPA's 2021 VISL calculator to estimate cancer and noncancer risk, which indicated that the noncancer risk exceeded EPA's target level at OSM-5 near residences near Array 3 (Appendix H, Table H-4). This pathway needs to be further evaluated using EPA's vapor intrusion guidance, specifically near shallow well OSM-5 to determine whether this is a pathway of concern. OSM-5 is located about 200 feet north-northeast of the residential enclosed structure. Groundwater flows south to southeast, towards the bayou and not in the direction of the residential enclosed structure. Additionally, soil sampling (LB8) conducted in 2018 in the front yard of the same residential property identified no detections of contaminants. EPA will completely evaluate this potential pathway within the next year.

The RAOs in the decision documents related to sediment and shellfish were to reduce or eliminate the direct contact threat posed by bayou sediments and to reduce or eliminate the potential for ingestion of carcinogens in shellfish. The March 2020 Limited Sediment Site Investigation Report identified that no free product was observed during the sampling, and concentrations in the sampled sediments were below the ROD cleanup goal of 1,300 mg/kg for total PAHs and below RECAP non-industrial screening standards for SVOCs. This could indicate that there is minimal, if any, dissolved phase transmission between the onsite groundwater and bayou sediments and surface water. The 1987 ROD stated that once the site was cleaned up, no significant long-term effects to shellfish were anticipated. Therefore, these RAOs are still valid and have been achieved. In May 2020, the Louisiana Department of Health and LDEQ rescinded the swimming and sediment contact advisory following the 2020 sediment sampling results.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

| Issues/Recommendations | | | | |
|--|--|--|--|--|
| OU(s) without Issues/Recommendations Identified in the FYR: | | | | |
| <i>None.</i> | | | | |

| Issues and Recommendations Identified in the FYR: | | | | |
|---|--|--|--|--|
|---|--|--|--|--|

| | | | | |
|--------------------------------------|---|--------------------------|---------------------------------------|-----------------------|
| OU(s): 1 and 2 | Issue Category: Institutional Controls | | | |
| | Issue: Institutional controls are not included in a decision document. | | | |
| | Recommendation: Evaluate the need for institutional controls and document in a decision document as appropriate. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA/State | EPA/State | 9/30/2024 |

| | | | | |
|--------------------------------------|---|--------------------------|---------------------------------------|-----------------------|
| OU(s): 2 | Issue Category: Institutional Controls | | | |
| | Issue: Institutional controls are not in place for off-site groundwater at the residential properties near Array 3. | | | |
| | Recommendation: Work with St. Tammany Parish to identify appropriate controls to inform residents of groundwater contamination and prevent groundwater use in the residential area near Array 3. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA/State | EPA/State | 8/12/2023 |

| | | | | |
|--------------------------------------|--|--------------------------|---------------------------------------|-----------------------|
| OU(s): 2 | Issue Category: Monitoring | | | |
| | Issue: The DNAPL source plume has not been fully delineated. Groundwater contamination has not been fully delineated. | | | |
| | Recommendation: Delineate the DNAPL source and groundwater contaminant plume. Evaluate the well network, groundwater flow, potential migration to surface water and contaminants sampled. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA/State | EPA/State | 8/12/2023 |

| | | | | |
|--------------------------------------|--|--------------------------|---------------------------------------|-----------------------|
| OU(s): 2 | Issue Category: Remedy Performance | | | |
| | Issue: Investigations indicated a portion of the DNAPL plume is potentially circumventing the southwest end of Array 2 and the northern portion of Array 3. | | | |
| | Recommendation: Conduct a supplemental investigation to evaluate potential modifications and/or remedial approaches to enhance capture of DNAPL and contaminated groundwater. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA/State | EPA/State | 8/12/2023 |

| | | | | |
|--------------------------------------|--|--------------------------|---------------------------------------|-----------------------|
| OU(s): 1 | Issue Category: Other | | | |
| | Issue: Per the 2018 site investigations, concentrations of contaminants in surface soil and subsurface soil were present in excess of Louisiana RECAP limiting standards and EPA RSLs. | | | |
| | Recommendation: Collect additional data to further investigate areas with soil contaminants above Louisiana RECAP limiting standards and EPA RSLs and determine whether additional response actions are needed. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA/State | EPA/State | 8/12/2023 |

| | | | | |
|--------------------------------------|---|--------------------------|---------------------------------------|-----------------------|
| OU(s): 2 | Issue Category: Other | | | |
| | Issue: EPA's screening level vapor intrusion review indicated that further vapor intrusion evaluation is appropriate in the residential area near Array 3. | | | |
| | Recommendation: Further evaluate the vapor intrusion pathway using EPA's vapor intrusion guidance for residential area near Array 3. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party/Support Agency | Milestone Date |
| No | Yes | EPA | EPA/State | 8/12/2023 |

OTHER FINDINGS

Additional recommendations were identified during the FYR. These recommendations do not affect current and/or future protectiveness.

- As part of LDEQ O&M activities, evaluate whether continued top-of-casing surveys are necessary to evaluate subsidence.
- The groundwater detection limit for naphthalene was too high to detect contamination below the EPA RSL. Determine whether there are other available methods to obtain data below the EPA RSL.
- The EPA RPM was unable to attend the FYR site inspection due to travel restrictions. The EPA RPM will visit the site prior to the next FYR, as restrictions allow.

VII. PROTECTIVENESS STATEMENT

| Protectiveness Statement | |
|---|---|
| <i>Operable Unit: 1</i> | <i>Protectiveness Determination:</i> Short-term Protective |
| <p><i>Protectiveness Statement:</i> The remedy at OU1 currently protects human health and the environment because contaminated sediments and creosote were excavated, incinerated and placed in an on-site landfill. However, in order for the remedy to be protective in the long term, the following actions need to be taken to ensure protectiveness:</p> <ul style="list-style-type: none"> • Collect additional data to further investigate areas with soil contaminants above RECAP limiting standards and EPA RSLs and determine whether additional response actions are needed. • Evaluate the need for institutional controls and document in a decision document as appropriate. | |

| Protectiveness Statement | |
|--|---|
| <i>Operable Unit: 2</i> | <i>Protectiveness Determination:</i> Short-term Protective |
| <p><i>Protectiveness Statement:</i> The remedy at OU2 currently protects human health and the environment because groundwater extraction and treatment are ongoing, institutional controls are in place on the site property, and there appear to be no current exposures to groundwater off site. However, in order for the remedy to be protective in the long term, the following actions need to be taken to ensure protectiveness:</p> <ul style="list-style-type: none"> • Evaluate the need for institutional controls and document in a decision document as appropriate. • Work with St. Tammany Parish to identify appropriate controls to inform residents of groundwater contamination and prevent groundwater use in the residential area near Array 3. • Delineate the DNAPL source and groundwater contaminant plume. Evaluate the well network, groundwater flow, potential migration to surface water and contaminants sampled. • Conduct a supplemental investigation to evaluate potential modifications and/or remedial approaches to enhance capture of DNAPL and contaminated groundwater. • Further evaluate the vapor intrusion pathway using EPA's vapor intrusion guidance for residential area near Array 3. | |

| Sitewide Protectiveness Statement | |
|--|---|
| | <i>Protectiveness Determination:</i> Short-term Protective |
| <p><i>Protectiveness Statement:</i> The remedy at the site currently protects human health and the environment. However, in order for the remedy to be protective in the long term, the following actions need to be taken to ensure protectiveness:</p> <ul style="list-style-type: none"> • Evaluate the need for institutional controls and document in a decision document as appropriate. • Work with St. Tammany Parish to identify appropriate controls to inform residents of groundwater contamination and prevent groundwater use in the residential area near Array 3. • Delineate the DNAPL source and groundwater contaminant plume. Evaluate the well network, groundwater flow, potential migration to surface water and contaminants sampled. • Conduct a supplemental investigation to evaluate potential modifications and/or remedial approaches to enhance capture of DNAPL and contaminated groundwater. • Collect additional data to further investigate areas with soil contaminants above RECAP limiting standards and EPA RSLs and determine whether additional response actions are needed. • Further evaluate the vapor intrusion pathway using EPA's vapor intrusion guidance for residential area near Array 3. | |

VIII. NEXT REVIEW

The next FYR Report for the Bayou Bonfouca Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Amendment to the Record of Decision Bayou Bonfouca Superfund Site. Slidell, Louisiana. U.S. Environmental Protection Agency. July 1995.

Email regarding Hurricane Zeta. Bayou Bonfouca Superfund Site. LDEQ. October 2020.

Explanation of Significant Differences. Bayou Bonfouca. U.S. Environmental Protection Agency. 1989.

Explanation of Significant Differences. Bayou Bonfouca. U.S. Environmental Protection Agency. February 5, 1990.

Fourth Five-Year Review Report for Bayou Bonfouca Superfund Site. Slidell, Tammany Parish, Louisiana. U.S. Environmental Protection Agency. July 2011.

Fifth Five-Year Review Report for Bayou Bonfouca Superfund Site. Slidell, Tammany Parish, Louisiana. U.S. Environmental Protection Agency. July 2016.

Limited Sediment Site Investigation Report. Bayou Bonfouca Superfund Site. Prepared for Louisiana Department of Environmental Quality Remediation Division by Leaaf Environmental LLC. March 2020.

Limited Site Investigation (Well Replacement) Work Plan and Quality Assurance / Quality Control Plan. Prepared for Louisiana Department of Environmental Quality Remediation Division. April 6, 2020.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. November 2020.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. September 2020.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. July 2020.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. June 2020.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. May 2020.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. April 2020.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. March 2020.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. February 2020.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. January 2020.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. January 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. February 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. March 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. April 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. May 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. June 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. July 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. August 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. September 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. October 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. November 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. SEMS, Inc. December 2019.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. January 2018.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. February 2018.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. March 2018.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. April 2018.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. May 2018.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. June 2018.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. July 2018.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. August 2018.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. September 2018.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. October 2018.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. December 2018.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. January 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. February 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. March 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. April 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. May 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. June 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. July 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. August 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. September 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. October 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. November 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. December 2017.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. December 2016.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. November 2016.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. October 2016.

Monthly Operational Report. Bayou Bonfouca Superfund Site. Providence Engineering and Environmental Group LLC. September 2016.

Operation and Maintenance Plan. Groundwater Extraction Wells and Groundwater Treatment System Modifications (Phase 2). Bayou Bonfouca Superfund Site. Slidell, Louisiana. Prepared for LDEQ. September 2012.

Optimization Review. Bayou Bonfouca Superfund Site. Slidell, St. Tammany Parish, Louisiana. Office of Land and Emergency Management, Office of Superfund Remediation and Technology Innovation. November 28, 2018.

Record of Decision Remedial Alternative Selection. Bayou Bonfouca, Slidell, Louisiana. U.S. Environmental Protection Agency. August 15, 1985.

Recovery Well Replacement Report. Bayou Bonfouca Superfund Site. Leaaf Environmental, LLC. September 2020.

Site Investigation and Risk Evaluation/Corrective Action Program Evaluation Report. Bayou Bonfouca Superfund Site. Prepared for Louisiana Department of Environmental Quality Remediation Division by Leaaf Environmental LLC. June 2019.

Site Investigation Submittal. Bayou Bonfouca Superfund Site. Prepared for Louisiana Department of Environmental Quality Remediation Division by Leaaf Environmental LLC. May 2018.

Superfund Record of Decision: Bayou Bonfouca, LA. U.S. Environmental Protection Agency. March 31, 1987.

APPENDIX B – SITE CHRONOLOGY

Table B-1: Site Chronology

| Event | Date |
|---|--------------------|
| A creosote plant operated on site under several different ownerships | 1882-1970 |
| U.S. Coast Guard undertook investigation of the Bayou Bonfouca waterway | 1976 |
| EPA, U.S. Coast Guard and National Oceanic and Atmospheric Administration conducted supplemental study of Bayou Bonfouca | 1978 |
| State of Louisiana rejected Braselman Corporation's proposed cleanup plan for on-site contamination | 1981 |
| EPA proposed Site for listing on Superfund program's NPL | December 30, 1982 |
| EPA finalized Site on NPL | September 8, 1983 |
| EPA initiated remedial investigation and feasibility study (RI/FS) | Late 1983 |
| EPA completed first phase of RI/FS | Summer 1984 |
| EPA completed Focused FS | May 1985 |
| EPA issued Administrative Order directing site owner to fence Site | July-August 1985 |
| EPA signed source control operable unit (OU1) ROD | August 15, 1985 |
| EPA completed supplemental phase II RI/FS | June 1986 |
| EPA signed Site's final ROD | March 31, 1987 |
| EPA conducted design investigations and discovered horizontal and vertical extent of contaminants in bayou sediments greater than expected based on earlier information | Summer 1988 |
| EPA signed Site's ESD | February 15, 1990 |
| EPA began operation of long-term remedial action for groundwater | July 10, 1991 |
| EPA initiated excavation and incineration activities for OU1 | November 1993 |
| EPA issued ROD Amendment calling for use of incinerator in treating wastes from nearby Southern Shipbuilding Corporation Superfund site | July 20, 1995 |
| EPA completed OU1 remedial activities | July 28, 1995 |
| EPA issued Site's first FYR Report | September 1996 |
| EPA removed incinerator after operations at Southern Shipbuilding Corporation site ceased | December 1996 |
| Braselman Corporation deeded site property to City | January 1997 |
| EPA issued Preliminary Close-Out Report for OU1 | September 30, 1997 |
| EPA completed Performance Evaluation Report for Site's groundwater system and determined system modifications were necessary | September 1997 |
| EPA completed phase I design investigation for OU1 | October 1998 |
| EPA issued Site's second FYR Report | June 2001 |
| EPA transferred responsibility for site O&M activities to LDEQ LDEQ completed final O&M Plan for groundwater extraction wells and modifications to groundwater treatment systems | July 2001 |
| LDEQ completed revised final O&M Plan Addendum | December 20, 2002 |
| EPA completed Site's sediment remedy re-evaluation | February 2003 |
| Hurricane Katrina made landfall near Site, resulting in damage to treatment system and groundwater treatment plant | August 29, 2005 |
| EPA issued Site's third FYR Report | June 2006 |
| LDEQ evaluated impact of Hurricane Katrina and Hurricane Rita storm surges on remedy's protectiveness | December 2006 |
| EPA issued Site's fourth FYR Report | July 2011 |
| LDEQ revised Site's O&M Plan | September 2012 |
| EPA issued Site's fifth FYR Report | August 12, 2016 |
| EPA completed Remedy Optimization Report | November 28, 2018 |
| LDEQ contractor completed Site Investigation and RECAP Report | June 2019 |

APPENDIX C – PRESS NOTICE



PUBLIC NOTICE

**Bayou Bonfouca Superfund Site
Public Notice
U.S. Environmental Protection Agency, Region 6**

September 2020

The U.S. Environmental Protection Agency, Region 6 (EPA) will be conducting the sixth five-year review of remedy implementation and performance at the Bayou Bonfouca Superfund site (Site) in Slidell, Louisiana. From 1882 to 1972, a creosote plant operated on site. During operations, many releases of creosote occurred from spills, runoff and discharges. These releases resulted in the contamination of soil, sediment and groundwater. The remedy consisted of dredging contaminated sediments from Bayou Bonfouca, on-site incineration of contaminated soils and sediments, and extraction and treatment of contaminated groundwater. The five-year review will determine if the remedies are still protective of human health and the environment. The five-year review is scheduled for completion in June 2021.

The report will be made available to the public at the following local information repository:

St. Tammany Parish Public Library – Slidell Branch
555 Robert Boulevard
Slidell, Louisiana 70458
(985) 646-6470

Site status updates are available on the Internet at
www.epa.gov/superfund/bayou-bonfouca

All media inquiries should be directed to the EPA Press Office at (214) 665-2200

For more information about the Site, contact:

Casey Luckett Snyder
Remedial Project Manager
(214) 665-7393
or 1-800-533-3508 (toll-free) or by
email at luckett.casey@epa.gov

Jason McKinney
EPA Community Involvement
Coordinator
(214) 665-8132
or 1-800-533-3508 (toll-free) or by
email at mckinney.jason@epa.gov

Keith Horn
Louisiana Department of
Environmental Quality,
Project Manager
(225) 219-3717 or by email at
keith.horn@la.gov

451861-sep 11-1t

APPENDIX D – SITE INSPECTION CHECKLIST

| FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST | | | |
|--|-------------------|---|-------------------|
| I. SITE INFORMATION | | | |
| Site Name: Bayou Bonfouca Superfund Site | | Date of Inspection: 2/2/2021 | |
| Location and Region: Slidell, St. Tammany Parish, Louisiana, Region 6 | | EPA ID: LAD980745632 | |
| Agency, Office or Company Leading the Five-Year Review: EPA | | Weather/Temperature: 40°F, partly cloudy | |
| Remedy Includes: (Check all that apply) | | | |
| <input checked="" type="checkbox"/> Landfill cover/containment | | <input type="checkbox"/> Monitored natural attenuation | |
| <input type="checkbox"/> Access controls | | <input checked="" type="checkbox"/> Groundwater containment | |
| <input type="checkbox"/> Institutional controls | | <input type="checkbox"/> Vertical barrier walls | |
| <input checked="" type="checkbox"/> Groundwater pump and treatment | | | |
| <input type="checkbox"/> Surface water collection and treatment | | | |
| <input type="checkbox"/> Other: _____ | | | |
| Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached | | | |
| II. INTERVIEWS (check all that apply) | | | |
| 1. O&M Site Manager <u>Rick Tibbs</u> <u>O&M Contractor</u> <u>01/12/2021</u> | | | |
| Name | | Title | Date |
| Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone: _____ | | | |
| Problems, suggestions <input type="checkbox"/> Report attached: _____ | | | |
| 2. O&M Staff _____ | | | |
| Name | | Title | Date |
| Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone: _____ | | | |
| Problems/suggestions <input type="checkbox"/> Report attached: _____ | | | |
| 3. Local Regulatory Authorities and Response Agencies (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply. | | | |
| Agency <u>LDEQ</u> | | | |
| Contact | <u>Keith Horn</u> | <u>Project</u> | <u>12/03/2021</u> |
| Name | | <u>Manager</u> | Phone No. |
| | | Title | |
| Problems/suggestions <input type="checkbox"/> Report attached: _____ | | | |
| Agency _____ | | | |
| Contact | _____ | _____ | _____ |
| Name | | Title | Phone No. |
| | | Date | |
| Problems/suggestions <input type="checkbox"/> Report attached: _____ | | | |
| Agency _____ | | | |
| Contact | _____ | _____ | _____ |
| Name | | Title | Phone No. |
| | | Date | |
| Problems/suggestions <input type="checkbox"/> Report attached: _____ | | | |
| Agency _____ | | | |
| Contact | _____ | _____ | _____ |
| Name | | Title | Phone No. |
| | | Date | |
| Problems/suggestions <input type="checkbox"/> Report attached: _____ | | | |

| |
|---|
| Agency _____ Contact _____ Name _____ Title _____ Date _____ Phone No. _____ Problems/suggestions <input type="checkbox"/> Report attached: _____ |
| 4. Other Interviews (optional) <input type="checkbox"/> Report attached: _____ |
| Blaine Clancy and private resident |
| <div style="text-align: center;">III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)</div> |
| <div> <div>1. O&M Documents</div> <div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> O&M manual <input checked="" type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs </div> <div> <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Readily available </div> <div> <input checked="" type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> Up to date </div> <div> <input type="checkbox"/> N/A <input type="checkbox"/> N/A <input type="checkbox"/> N/A </div> </div> <div>Remarks: <u>Maintenance logs included as part of O&M reports.</u></div> </div> |
| <div> <div>2. Site-Specific Health and Safety Plan</div> <div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> Contingency plan/emergency response plan </div> <div> <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available </div> <div> <input checked="" type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date </div> <div> <input type="checkbox"/> N/A <input type="checkbox"/> N/A </div> </div> <div>Remarks: _____</div> </div> |
| <div> <div>3. O&M and OSHA Training Records</div> <div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> Readily available </div> <div> <input type="checkbox"/> Up to date </div> <div> <input type="checkbox"/> N/A </div> </div> <div>Remarks: <u>Information on 40-hour HAZWOPER trainings and refreshers required by state available.</u></div> </div> |
| <div> <div>4. Permits and Service Agreements</div> <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Air discharge permit <input checked="" type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits: _____ </div> <div> <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available </div> <div> <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date </div> <div> <input checked="" type="checkbox"/> N/A <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A </div> </div> <div>Remarks: <u>Treated groundwater discharge authorized under CERCLA.</u></div> </div> |
| <div> <div>5. Gas Generation Records</div> <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Readily available </div> <div> <input type="checkbox"/> Up to date </div> <div> <input checked="" type="checkbox"/> N/A </div> </div> <div>Remarks: _____</div> </div> |
| <div> <div>6. Settlement Monument Records</div> <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Readily available </div> <div> <input type="checkbox"/> Up to date </div> <div> <input checked="" type="checkbox"/> N/A </div> </div> <div>Remarks: _____</div> </div> |
| <div> <div>7. Groundwater Monitoring Records</div> <div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> Readily available </div> <div> <input checked="" type="checkbox"/> Up to date </div> <div> <input type="checkbox"/> N/A </div> </div> <div>Remarks: _____</div> </div> |
| <div> <div>8. Leachate Extraction Records</div> <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Readily available </div> <div> <input type="checkbox"/> Up to date </div> <div> <input checked="" type="checkbox"/> N/A </div> </div> <div>Remarks: _____</div> </div> |
| <div> <div>9. Discharge Compliance Records</div> <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Air <input checked="" type="checkbox"/> Water (effluent) </div> <div> <input type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available </div> <div> <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date </div> <div> <input checked="" type="checkbox"/> N/A <input type="checkbox"/> N/A </div> </div> <div>Remarks: <u>Records available in O&M reports.</u></div> </div> |
| <div> <div>10. Daily Access/Security Logs</div> <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Readily available </div> <div> <input type="checkbox"/> Up to date </div> <div> <input checked="" type="checkbox"/> N/A </div> </div> </div> |

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| Remarks: <u>Treatment plant operators are on site daily.</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IV. O&M COSTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. O&M Organization <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <input type="checkbox"/> State in-house <input type="checkbox"/> PRP in-house <input type="checkbox"/> Federal facility in-house <input type="checkbox"/> _____ </div> <div style="width: 48%;"> <input checked="" type="checkbox"/> Contractor for state <input type="checkbox"/> Contractor for PRP <input type="checkbox"/> Contractor for Federal facility </div> </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. O&M Cost Records <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date </div> <input type="checkbox"/> Funding mechanism/agreement in place <input checked="" type="checkbox"/> Unavailable Original O&M cost estimate: _____ <input type="checkbox"/> Breakdown attached <div style="text-align: center; margin-top: 5px;">Total annual cost by year for review period if available</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">From: _____</td> <td style="width: 25%;">To: _____</td> <td style="width: 25%;">_____</td> <td style="width: 25%; text-align: right;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr><td colspan="4"> </td></tr> <tr> <td>From: _____</td> <td>To: _____</td> <td>_____</td> <td style="text-align: right;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr><td colspan="4"> </td></tr> <tr> <td>From: _____</td> <td>To: _____</td> <td>_____</td> <td style="text-align: right;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr><td colspan="4"> </td></tr> <tr> <td>From: _____</td> <td>To: _____</td> <td>_____</td> <td style="text-align: right;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr><td colspan="4"> </td></tr> <tr> <td>From: _____</td> <td>To: _____</td> <td>_____</td> <td style="text-align: right;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> </table> | | | | From: _____ | To: _____ | _____ | <input type="checkbox"/> Breakdown attached | Date | Date | Total cost | | | | | | From: _____ | To: _____ | _____ | <input type="checkbox"/> Breakdown attached | Date | Date | Total cost | | | | | | From: _____ | To: _____ | _____ | <input type="checkbox"/> Breakdown attached | Date | Date | Total cost | | | | | | From: _____ | To: _____ | _____ | <input type="checkbox"/> Breakdown attached | Date | Date | Total cost | | | | | | From: _____ | To: _____ | _____ | <input type="checkbox"/> Breakdown attached | Date | Date | Total cost | |
| From: _____ | To: _____ | _____ | <input type="checkbox"/> Breakdown attached | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Date | Date | Total cost | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| From: _____ | To: _____ | _____ | <input type="checkbox"/> Breakdown attached | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Date | Date | Total cost | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| From: _____ | To: _____ | _____ | <input type="checkbox"/> Breakdown attached | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Date | Date | Total cost | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Unanticipated or Unusually High O&M Costs during Review Period Describe costs and reasons: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V. ACCESS AND INSTITUTIONAL CONTROLS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. Fencing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Fencing Damaged <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Gates secured <input type="checkbox"/> N/A Remarks: <u>Fencing appeared in good condition. Gates were locked.</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B. Other Access Restrictions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Signs and Other Security Measures <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A Remarks: <u>Signage appeared in good condition.</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C. Institutional Controls (ICs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 1. Implementation and Enforcement Site conditions imply ICs not properly implemented <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Site conditions imply ICs not being fully enforced <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Type of monitoring (e.g., self-reporting, drive by): _____ Frequency: _____ Responsible party/agency: _____ <div style="display: flex; justify-content: space-between;"> <div style="width: 20%;">Contact _____</div> <div style="width: 20%;">_____</div> <div style="width: 20%;">_____</div> <div style="width: 20%;">_____</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 20%;">Name</div> <div style="width: 20%;">Title</div> <div style="width: 20%;">Date</div> <div style="width: 20%;">Phone no.</div> </div> Reporting is up to date <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Reports are verified by the lead agency <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Specific requirements in deed or decision documents have been met <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Violations have been reported <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Other problems or suggestions: <input type="checkbox"/> Report attached | | | |
| 2. Adequacy <input type="checkbox"/> ICs are adequate <input checked="" type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A Remarks: <u>ICs for off-site groundwater outside of Slidell are needed.</u> | | | |
| D. General | | | |
| 1. Vandalism/Trespassing <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No vandalism evident Remarks: _____ | | | |
| 2. Land Use Changes On Site <input type="checkbox"/> N/A Remarks: <u>No on site land use changes</u> | | | |
| 3. Land Use Changes Off Site <input type="checkbox"/> N/A Remarks: <u>In 2017-2018, the city made improvements to promote boating access along Bayou Bonfouca adjacent to site. Improvements included floating docks, piers, pedestrian pathways and other amenities to encourage recreational boating on bayou.</u> | | | |
| VI. GENERAL SITE CONDITIONS | | | |
| A. Roads <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | | | |
| 1. Roads Damaged <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A Remarks: _____ | | | |
| B. Other Site Conditions | | | |
| Remarks: _____ | | | |
| VII. LANDFILL COVERS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | | | |
| A. Landfill Surface | | | |
| 1. Settlement (low spots) <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Settlement not evident Area extent: _____ Depth: _____ Remarks: _____ | | | |
| 2. Cracks <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Cracking not evident Lengths: _____ Widths: _____ Depths: _____ | | | |

| | | | |
|---|--|--|--|
| Remarks: _____ | | | |
| 3. Erosion | <input type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> Erosion not evident | |
| Area extent: _____ | | Depth: _____ | |
| Remarks: _____ | | | |
| 4. Holes | <input type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> Holes not evident | |
| Area extent: _____ | | Depth: _____ | |
| Remarks: _____ | | | |
| 5. Vegetative Cover | <input checked="" type="checkbox"/> Grass | <input checked="" type="checkbox"/> Cover properly established | |
| <input checked="" type="checkbox"/> No signs of stress | <input type="checkbox"/> Trees/shrubs (indicate size and locations on a diagram) | | |
| Remarks: _____ | | | |
| 6. Alternative Cover (e.g., armored rock, concrete) | <input checked="" type="checkbox"/> N/A | | |
| Remarks: _____ | | | |
| 7. Bulges | <input type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> Bulges not evident | |
| Area extent: _____ | | Height: _____ | |
| Remarks: _____ | | | |
| 8. Wet Areas/Water Damage | <input checked="" type="checkbox"/> Wet areas/water damage not evident | | |
| <input type="checkbox"/> Wet areas | <input type="checkbox"/> Location shown on site map | Area extent: _____ | |
| <input type="checkbox"/> Ponding | <input type="checkbox"/> Location shown on site map | Area extent: _____ | |
| <input type="checkbox"/> Seeps | <input type="checkbox"/> Location shown on site map | Area extent: _____ | |
| <input type="checkbox"/> Soft subgrade | <input type="checkbox"/> Location shown on site map | Area extent: _____ | |
| Remarks: _____ | | | |
| 9. Slope Instability | <input type="checkbox"/> Slides | <input type="checkbox"/> Location shown on site map | |
| <input checked="" type="checkbox"/> No evidence of slope instability | | | |
| Area extent: _____ | | | |
| Remarks: _____ | | | |
| B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.) | | | |
| C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| (Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.) | | | |
| D. Cover Penetrations <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | | | |
| 1. Gas Vents | <input type="checkbox"/> Active | <input checked="" type="checkbox"/> Passive | |
| <input type="checkbox"/> Properly secured/locked | <input type="checkbox"/> Functioning | <input type="checkbox"/> Routinely sampled | <input checked="" type="checkbox"/> Good condition |
| <input type="checkbox"/> Evidence of leakage at penetration | | <input type="checkbox"/> Needs maintenance | <input type="checkbox"/> N/A |
| Remarks: _____ | | | |

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|--|--|--|--|
| 2. Gas Monitoring Probes <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A Remarks: _____ | | | |
| 3. Monitoring Wells (within surface area of landfill) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A Remarks: _____ | | | |
| 4. Extraction Wells Leachate <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A Remarks: _____ | | | |
| 5. Settlement Monuments <input type="checkbox"/> Located <input type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A Remarks: <u>Operators regularly monitor for subsidence at the Site.</u> | | | |
| E. Gas Collection and Treatment <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| F. Cover Drainage Layer <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| 1. Outlet Pipes Inspected <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks: _____ | | | |
| 2. Outlet Rock Inspected <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks: _____ | | | |
| G. Detention/Sedimentation Ponds <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| H. Retaining Walls <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| I. Perimeter Ditches/Off-Site Discharge <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | | | |
| 1. Siltation <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Siltation not evident Area extent: _____ Depth: _____ Remarks: _____ | | | |
| 2. Vegetative Growth <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Vegetation does not impede flow Area extent: _____ Type: _____ Remarks: _____ | | | |
| 3. Erosion <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Erosion not evident Area extent: _____ Depth: _____ Remarks: _____ | | | |
| 4. Discharge Structure <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks: _____ | | | |
| VIII. VERTICAL BARRIER WALLS <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |

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|--|--|--|--|
| IX. GROUNDWATER/SURFACE WATER REMEDIES <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | | | |
| A. Groundwater Extraction Wells, Pumps and Pipelines <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | | | |
| 1. Pumps, Wellhead Plumbing and Electrical | | | |
| <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A Remarks: _____ | | | |
| 2. Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances | | | |
| <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____ | | | |
| 3. Spare Parts and Equipment | | | |
| <input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks: <u>As treatment system ages, more difficult to obtain some parts.</u> | | | |
| B. Surface Water Collection Structures, Pumps and Pipelines <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| C. Treatment System <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | | | |
| 1. Treatment Train (check components that apply) | | | |
| <input type="checkbox"/> Metals removal <input checked="" type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input checked="" type="checkbox"/> Carbon adsorbers <input checked="" type="checkbox"/> Filters: _____ <input type="checkbox"/> Additive (e.g., chelation agent, flocculent): _____ <input type="checkbox"/> Others: _____ <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input checked="" type="checkbox"/> Equipment properly identified <input checked="" type="checkbox"/> Quantity of groundwater treated annually: <u>Refer to reports</u> <input type="checkbox"/> Quantity of surface water treated annually: _____ Remarks: _____ | | | |
| 2. Electrical Enclosures and Panels (properly rated and functional) | | | |
| <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____ | | | |
| 3. Tanks, Vaults, Storage Vessels | | | |
| <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs maintenance Remarks: _____ | | | |
| 4. Discharge Structure and Appurtenances | | | |
| <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____ | | | |
| 5. Treatment Building(s) | | | |

| | | |
|--|---|---|
| <input type="checkbox"/> N/A | <input checked="" type="checkbox"/> Good condition (esp. roof and doorways) | <input type="checkbox"/> Needs repair |
| <input checked="" type="checkbox"/> Chemicals and equipment properly stored | | |
| Remarks: _____ | | |
| 6. Monitoring Wells (pump and treatment remedy) | | |
| <input checked="" type="checkbox"/> Properly secured/locked | <input checked="" type="checkbox"/> Functioning | <input checked="" type="checkbox"/> Routinely sampled |
| <input type="checkbox"/> All required wells located | <input type="checkbox"/> Needs maintenance | <input type="checkbox"/> N/A |
| Remarks: _____ | | |
| D. Monitoring Data | | |
| 1. Monitoring Data | | |
| <input checked="" type="checkbox"/> Is routinely submitted on time | <input checked="" type="checkbox"/> Is of acceptable quality | |
| 2. Monitoring Data Suggests: | | |
| <input type="checkbox"/> Groundwater plume is effectively contained | <input type="checkbox"/> Contaminant concentrations are declining | |
| E. Monitored Natural Attenuation | | |
| 1. Monitoring Wells (natural attenuation remedy) | | |
| <input type="checkbox"/> Properly secured/locked | <input type="checkbox"/> Functioning | <input type="checkbox"/> Routinely sampled |
| <input type="checkbox"/> All required wells located | <input type="checkbox"/> Needs maintenance | <input checked="" type="checkbox"/> N/A |
| Remarks: _____ | | |
| X. OTHER REMEDIES | | |
| If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction. | | |
| XI. OVERALL OBSERVATIONS | | |
| A. Implementation of the Remedy | | |
| Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). <u>The remedy is partially functioning as designed. Groundwater extraction, treatment and monitoring are ongoing. The current pump-and-treat remedy is not effective in reducing the DNAPL distribution or containing the dissolved groundwater contamination. The extent of DNAPL and groundwater contamination are not fully known and require delineation. EPA plans to conduct a supplemental investigation to evaluate potential modifications and/or remedial approaches to enhance capture of DNAPL and contaminated groundwater. Institutional controls are in place for on-site groundwater and soil via a 2008 Conveyance Notification. Discussions are ongoing about appropriate avenues to restrict groundwater use on the residential properties near Array 3. Contamination was recently discovered in soil above state standards. Delineation of the shallow contamination found in Heritage Park and the residential area is part of the upcoming Site investigation. Options for engineering controls, institutional controls or removal of contaminated shallow soils will be evaluated at that time. Lastly, the vapor intrusion pathway requires additional evaluation using EPA's vapor intrusion guidance to determine whether this pathway is of concern.</u> | | |
| B. Adequacy of O&M | | |
| Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. <u>O&M on the cap appears adequate. Additional groundwater sampling is warranted to delineate the DNAPL and the dissolved groundwater plume. As part of LDEQ O&M activities, an evaluation is appropriate to determine whether continued top-of-casing surveys are necessary to evaluate subsidence.</u> | | |
| C. Early Indicators of Potential Remedy Problems | | |
| Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. <u>The 1987 ROD described that the groundwater process was to be designed to achieve applicable and relevant Federal and State standards and that the groundwater remediation would in essence be a pilot study. Until specific field data were collected, it was unknown what cleanup levels would be technologically achievable. The 2016</u> | | |

FYR Report identified as an issue that groundwater cleanup goals had not been met for the Site with the current remedy and would unlikely be met in an acceptable timeframe. EPA plans to evaluate various remedial approaches which could contain or reduce the extent of DNAPL and groundwater contamination.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

N/A

APPENDIX E – REMEDIAL ACTION AND SITE INSPECTION PHOTOS

BEFORE – Remedial Action Photos: 1993-1994



Bayou remedial activities



Incinerator operations

AFTER – Site Inspection Photos: February 2021



Top of cap, facing south



Gas vent



Array 1a, facing east



Array 2 and cap as seen from Heritage Park



Well in Array 3



MW-1



Bayou Bonfouca near boat ramp



Bayou Bonfouca



Dock area with cap in background



Fencing along dock with signage



Groundwater treatment plant building



Treatment units at groundwater treatment plant



Discharge from treatment plant to bayou



Area near TG-31



LDEQ photos of labeled subsidence monitoring well SM-5R1. The labeling occurred after the site inspection.

APPENDIX F – SUPPORTING DATA

Figure F-1: 2020 Sediment Sample Locations, from March 2020 Limited Sediments Site Investigation Report




| | | | |
|---|----------------|-------------------------------|---------------------|
|  Leaaf Environmental, LLC www.leaaf.com | <i>Source:</i> | <i>Property:</i> | <i>Figure 2:</i> |
| | LDEQ, 2019 | Bayou Bonfouca Slidell, LA | Sample Location Map |

Figure F-2: Contaminants Detected in 2020 Sediment Sampling, from March 2020 Limited Sediments Site Investigation Report

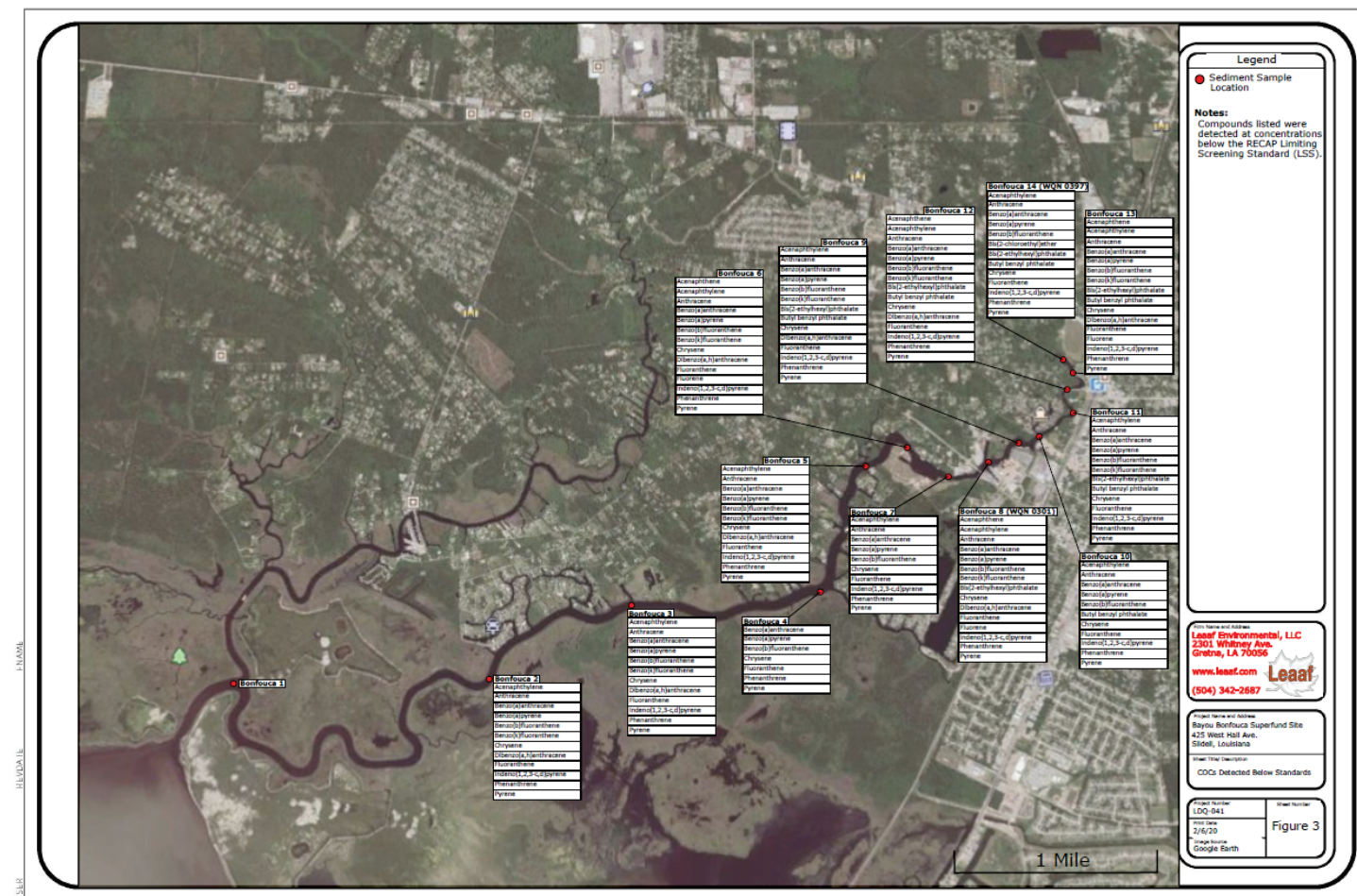


Figure F-3: Contaminants Detected in Surface Soils, from 2019 Site Investigation & RECAP Evaluation Report

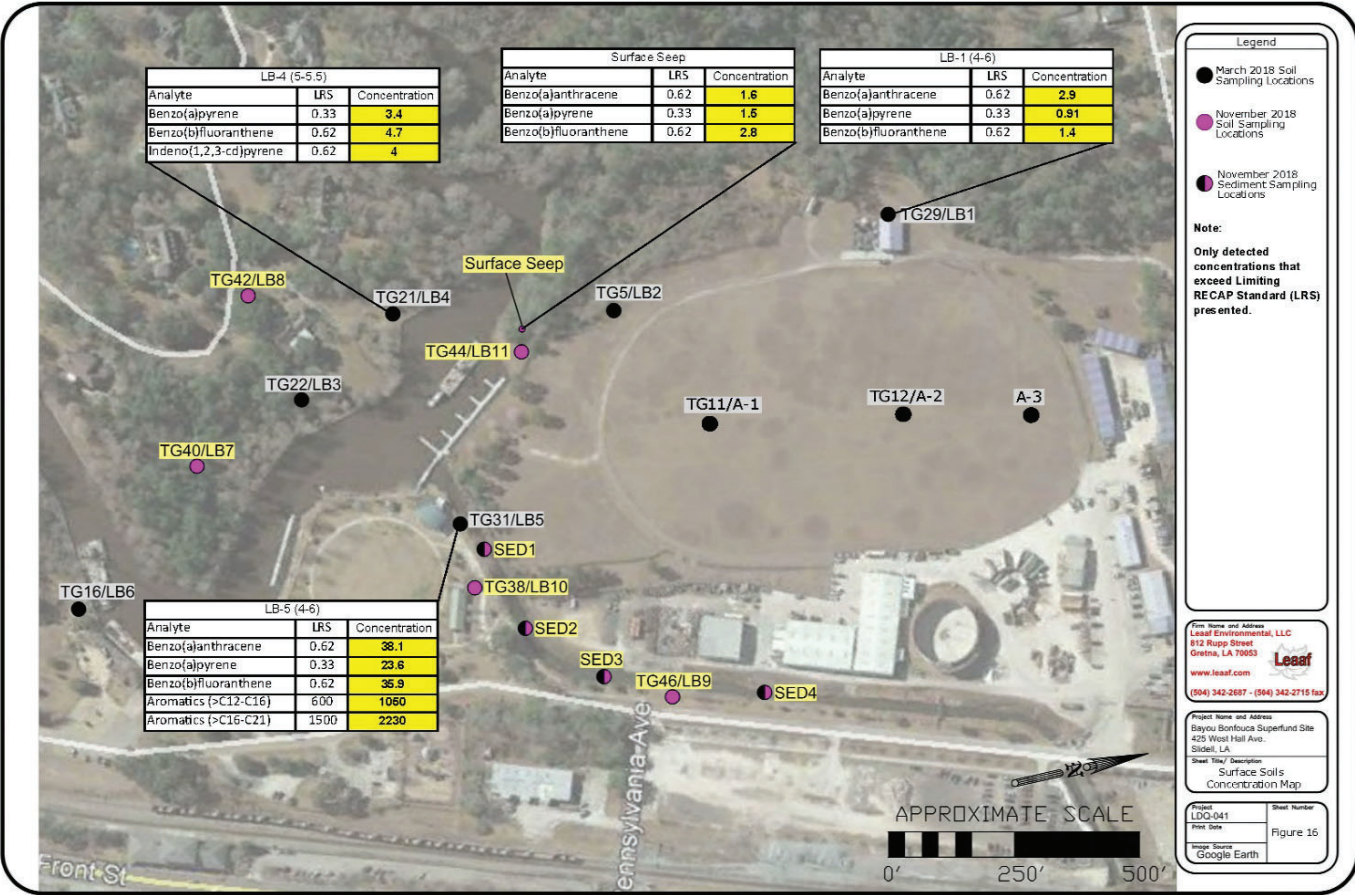


Figure F-4: Contaminants Detected in Subsurface Soils, from 2019 Site Investigation & RECAP Evaluation Report

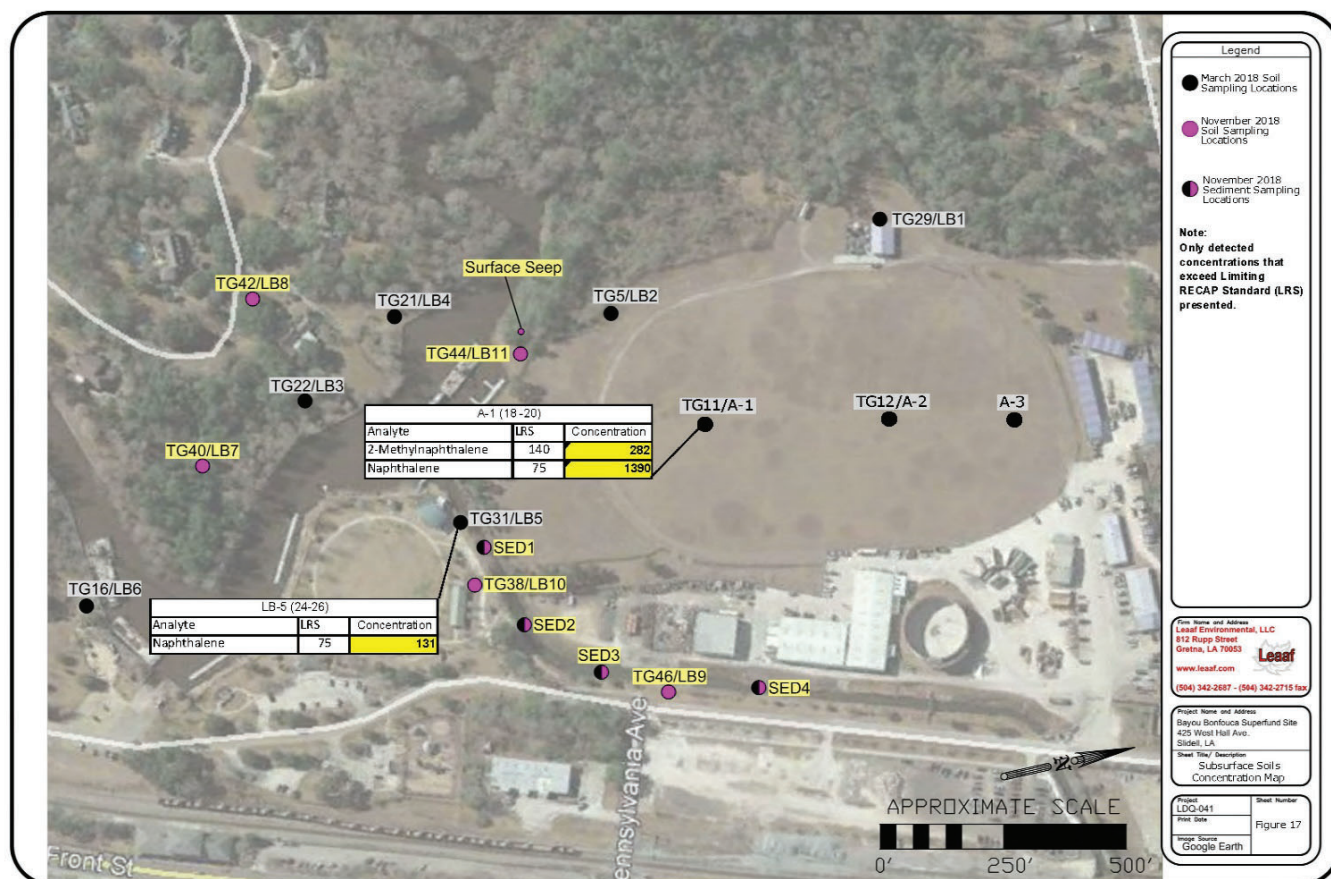


Figure F-5: Groundwater Sampling Data, from 2019 Site Investigation and RECAP Evaluation Report



















Figure F-6: October 2020 Groundwater Monitoring Data, from November 2020 Monthly Operational Report

TABLE 8
QUARTERLY ANALYTICAL SAMPLE SUMMARY
GROUNDWATER MONITORING WELL (GMW)
SAMPLED ON A SEMI-ANNUAL BASIS
BAYOU BONFOUCA SUPERFUND SITE
425 WEST HALL AVENUE
SLIDELL, LOUISIANA
LDEQ AGENCY INTEREST NO.4716

| Constituents | Units | Monitor Well MW-1 | Monitor Well MW-2 | Monitor Well SM-3 | Monitor Well SM-7 | Monitor Well MW-1 | Monitor Well MW-2 | Monitor Well SM-3 | Monitor Well SM-8 |
|---|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | | Oct. 20 GMW-221 | Oct. 20 GMW-222 | Oct. 20 GMW-223 | Oct. 20 GMW-224 | Feb. 20 GMW-217 | Feb. 20 GMW-218 | Feb. 20 GMW-219 | Feb. 20 GMW-220 |
| | | Results | Results | Results | Results | Results | Results | Results | Results |
| Arenaphene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Arenaphylene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Anthracene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Benzidine | ug/L | < 30 | < 30 | < 30 | < 30 | < 30 | < 30 | < 30 | < 30 |
| Benzo(a)anthracene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Benzo(b)fluoranthene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Benzo(k)fluoranthene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Benzo(a,h)pyrene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Benzo(a)pyrene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 4-Bromophenyl Phenyl Ether | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Bis(2-chloroethoxy)methane | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Bis(2-chloroethoxy)methane | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 2-Chlorophenol | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 2-Chlorophenol | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 3,4-Dichlorophenol | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 4-Chlorophenyl phenyl ether | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Chrysene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Dibenz(a,h)anthracene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 1,2-Dichlorobenzene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 1,3-Dichlorobenzene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 1,4-Dichlorobenzene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 3,3'-Dichlorobenzidine | ug/L | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 |
| 2,4-Dichlorophenol | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Dibutylphthalate | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 2,4-Dimethylphenol | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Dimethyl Phthalate | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Di-n-butylphthalate | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 4,6-Dinitro-o-Cresol (4,6-Dinitro-2-methylphenol) | ug/L | < 25 | < 25 | < 25 | < 25 | < 25 | < 25 | < 25 | < 25 |
| 2,4-Dinitrophenol | ug/L | < 50 | < 50 | < 50 | < 50 | < 50 | < 50 | < 50 | < 50 |
| 2,4-Dinitrotoluene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 2,6-Dinitrotoluene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Di-n-octyl phthalate | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 1,2-Diphenylhydrazine | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Bis(2-Ethylhexyl) phthalate | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Fluoranthene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Fluorene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Hexachlorocyclopentadiene | ug/L | < 40 | < 40 | < 40 | < 40 | < 40 | < 40 | < 40 | < 40 |
| Hexachloroethane | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Indeno(1,2,3-c,d)pyrene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Isophorone | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Naphthalene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Nitrobenzene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 2-Nitrophenol | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 4-Nitrophenol | ug/L | < 40 | < 40 | < 40 | < 40 | < 40 | < 40 | < 40 | < 40 |
| N-Nitrosodimethylamine | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| N-Nitrosodiphenylamine | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| N-Nitrosodi-n-Propylamine | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 2,2'-Oxybis(1-chloropropane) | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Bis(2-Chloroisopropyl) ether | ug/L | < 40 | < 40 | < 40 | < 40 | < 40 | < 40 | < 40 | < 40 |
| Permethrin | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Phenanthrene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Phenol | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Pyrene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 1,2,4-Trichlorobenzene | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| 2,4,6-Trichlorophenol | ug/L | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Notes:
1) Concentrations exceeding the limiting standard are
2) < = less than the laboratory detection limit.

Figure F-7: Effluent Discharge Water Analytical Data, from September 2020 Monthly Operational Report

TABLE 7
QUARTERLY ANALYTICAL SAMPLE SUMMARY
EFFLUENT DISCHARGE WATER (EDW)
425 WEST HALL AVENUE
SLIDELL, LOUISIANA
LDEQ AGENCY INTEREST NO. 4716

| Constituents | Effluent Limitations | July-20 EDW-790 | | April-20 EDW-787 | | January-20 EDW-784 | | July-19 EDW-778 | |
|--|----------------------|--------------------|---------------------|---------------------|---------------------|-----------------------|---------------------|--------------------|---------------------|
| | | Results | Exceed? (Y or N) | Results | Exceed? (Y or N) | Results | Exceed? (Y or N) | Results | Exceed? (Y or N) |
| Acrolein | 100 ug/L | < 20 | N | < 20 | N | < 20 | N | < 20 | N |
| Acrylonitrile | 232 ug/L | < 20 | N | < 20 | N | < 20 | N | < 20 | N |
| Benzene | 134 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Dichloromethane | 100 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Bromoform | 100 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Methyl Bromide (Bromomethane) | 100 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Carbon Tetrachloride | 380 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Chlorobenzene | 380 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Chloroethane | 393 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| 1-Chloroethyl Vinyl Ether | 100 ug/L | < 20 | N | < 20 | N | < 20 | N | < 20 | N |
| Chloroform | 323 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Methyl Chloride (Chloromethane) | 295 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Chlorodibromomethane | 100 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| 1,1-Dichloroethane | 39 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| 1,2-Dichloroethane | 574 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| 1,1-Dichloroethylene (1,1-Dichloroethene) | 60 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| 1,2-Trans-Dichloroethene | 172 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| 1,2-Dichloropropane | 794 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Total 1,3-Dichloropropene (cis and trans-1,3-Dichloropropene) | 794 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Ethylbenzene | 380 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Methylene Chloride | 170 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| 1,1,2,2-Tetrachloroethane | 100 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Tetrachloroethene | 164 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Toluene | 74 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| 1,1,1-Trichloroethane | 39 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| 1,1,2-Trichloroethane | 127 ug/L | < 5 | N | < 5 | N | < 5 | N | < 5 | N |
| Vinyl Chloride | 69 ug/L | < 2 | N | < 2 | N | < 2 | N | < 2 | N |
| Acenaphthene | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Acenaphthylene | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Anthracene | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Benztidine | 100 ug/L | < 30 | N | < 30 | N | < 30 | N | < 30 | N |
| Benzo(a)anthracene | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Benzo(b)fluoranthene | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Benzo(k)fluoranthene | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Benzo(a,h)pyrene | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Benzo(a)pyrene | 48 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 4-Bromophenyl Phenyl Ether | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Bis(4-benzyl)phthalate | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| bis(2-Chlorophenyl)methane | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| bis(2-Chlorophenyl)ether | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 2-Chloronaphthalene | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 2-Chlorophenol | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 3,4-Chlorophenol | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 4-Chlorophenyl phenyl ether | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Chrysene | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Dibenz(a,h)anthracene | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 1,2-Dichlorobenzene | 794 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 1,3-Dichlorobenzene | 380 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 1,4-Dichlorobenzene | 380 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 3,3-Dichlorobenzidine | 100 ug/L | < 20 | N | < 20 | N | < 20 | N | < 20 | N |
| 2,4-Dichlorophenol | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Dibenzophthalate | 113 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 2,4-Dimethylphenol | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Dimethyl Phthalate | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Di-n-butylphthalate | 43 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 4,6-Dinitro-o-Cresol (4,6-Dinitro-2-methylphenol) | 277 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 2,4-Dinitrophenol | 4291 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 2,4-Dinitrotoluene | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 2,6-Dinitrotoluene | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Di-n-octyl phthalate | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 1,7-Diphenylvinylcarbazone | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| bis(2-Ethylhexyl) phthalate | 238 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Fluoranthene | 54 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Fluorene | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Hexachlorocyclopentadiene | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Hexachloroethane | 794 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Indene(1,2,3-c,d)pyrene | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Iopthalene | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Naphthalene | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Nitrobenzene | 6402 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 2-Nitrophenol | 231 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 4-Nitrophenol | 267 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| N-Nitrosodimethylamine | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| N-Nitrosodibenzylamine | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| N-Nitrosodi-n-Propylamine | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 2,2'-Oxybis(1-chloropropane) | 794 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| bis(1-Chloro-2-propenyl) Ether | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Permethrin | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Phenanthrene | 47 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Phenol | 48 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| Pyrene | 794 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 1,2,4-Trichlorobenzene | 794 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |
| 2,4,6-Trichlorophenol | 100 ug/L | < 10 | N | < 10 | N | < 10 | N | < 10 | N |

Notes:

- 1) Concentrations exceeding the limiting standard are
- 2) < = less than the laboratory detection limit.

Figure F-8: Effluent Discharge Water Analytical Data, from June 2019 Monthly Operational Report

| | | TABLE F | | QUARTERLY ANALYTICAL RESULTS - EFFLUENT DISCHARGE WATER (QD) | | NORTH MANITOBA WASTEWATER TREATMENT PLANT | | SURREY, ST. THOMAS FACILITY (SURREY) | |
|-------------|--|---------|--|--|--|---|--|--------------------------------------|--|
| Coordinates | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
| | | Q1 2019 | | Q2 2019 | | Q3 2019 | | Q4 2019 | |
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APPENDIX G – DETAILED ARARS REVIEW TABLE

Groundwater

The 1987 ROD said, “The current criteria by the Clean Water Act for drinking water only suggests a contamination level no greater than 3.1 ng/L for PAHs.” The 1987 ROD also said, “The groundwater will be treated as closely as technically possible to MCLs. This will be done both on and off site.”

Table G-1 compares the 1987 ROD cleanup goal to the current MCL for benzo(a)pyrene, a proxy for total PAHs. The current MCL is less stringent for PAHs than the ROD cleanup goal, indicating that the cleanup goal remains protective.

Table G-1: Groundwater ARARs

| Contaminant | Groundwater Cleanup Goal (ng/L) | Current MCL (ng/L) ^a | ARAR Change |
|--|------------------------------------|------------------------------------|----------------|
| Total PAHs | 3.1 | 200 | less stringent |
| <i>Notes:</i> a. MCLs were accessed on 11/25/2020 at https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations . Benzo(a)pyrene is one of the more commonly monitored PAHs. It is used as a proxy for PAHs. | | | |

APPENDIX H – SCREENING-LEVEL RISK REVIEWS

Soil Cleanup Goal

The 1987 ROD established a soil cleanup goal of 100 mg/kg of total PAHs, based on human health risk. The 1990 ESD re-evaluated ROD action levels, showing that the 1987 ROD cleanup goal for total PAHs is equivalent to approximately 9 mg/kg carcinogenic PAHs. In the ESD, this was determined to correspond to acceptable risk levels for residential use.

To evaluate whether the cleanup goal selected remains valid, the goal was compared to the EPA's current RSL for residential use. RSLs incorporate current toxicity values and standard default exposure factors. Residential soil RSLs were selected for this evaluation, because the ESD evaluated the risk to a future resident. As shown in Table H-1, the cleanup goal corresponds to risk below or within EPA's acceptable risk range and therefore remains protective.

Table H-1: Soil Screening-Level Risk Assessment

| Contaminant | Soil Cleanup Goal (mg/kg) | EPA Residential RSL ^{a,b} (mg/kg) | | Residential Risk Level | |
|--|---------------------------|--|--------|--------------------------|---------------------------|
| | | 1 x 10 ⁻⁶ Risk | HQ = 1 | Cancer Risk ^c | Noncancer HQ ^d |
| Total PAHs | 9 | 0.11 | 18 | 8.18 x 10 ⁻⁵ | 0.5 |
| <p><i>Notes:</i></p> <ul style="list-style-type: none"> a. November 2020 RSLs accessed on 12/10/2020 at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables. b. Benzo(a)pyrene is used as a proxy for carcinogenic PAHs. c. Cancer risk was calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10⁻⁶ risk: cancer risk = (cleanup goal / cancer RSL) x 10⁻⁶. d. Noncancer risk was calculated using the following equation, based on the fact that RSLs are derived based on a hazard quotient (HQ) of 1: noncancer risk = cleanup goal / noncancer RSL. | | | | | |

Sediment Cleanup Goal

The 1987 ROD identified a sediment cleanup goal of 1,300 mg/kg for total PAHs. This cleanup goal was calculated based on site-specific tests to mitigate further groundwater contamination and significantly reduce hazard to aquatic biota.

In 2003, EPA's Environmental Response Team conducted an evaluation of whether site cleanup goals were being met for sediment and whether dredging was an effective remedial approach. The investigation focused on the collection and chemical analyses of site sediments and surface water, a benthic macroinvertebrate survey, and sediment toxicological evaluations. In the most heavily contaminated sediment location, the most contaminated sample contained less than 100 mg/kg total PAHs, indicating the contaminant-level remediation objective has been met. A benthic macroinvertebrate community survey was conducted at eight sampling locations. A total of 131 organisms representing 17 taxa were collected. All of the species were characteristic of low-salinity tidal freshwater habitats. The report stated that the benthic community has improved as a result of the remediation and the presence of pollution-sensitive species in the remediated area indicates the quality of the benthic community should continue to improve in the future.

In 2020, an LDEQ contractor conducted a limited sediment site investigation to evaluate current concentrations of sediment COCs in Bayou Bonfouca. Concentrations of SVOCs in the sampled sediments were below both the 1,300 mg/kg ROD cleanup goal for total PAHs and below RECAP non-

industrial screening standards. The LDEQ contractor recommended no further investigation. Appendix F, Figure F-1 and Figure F-2 show the sediment sample locations and contaminants detected at each location.

Vapor Intrusion

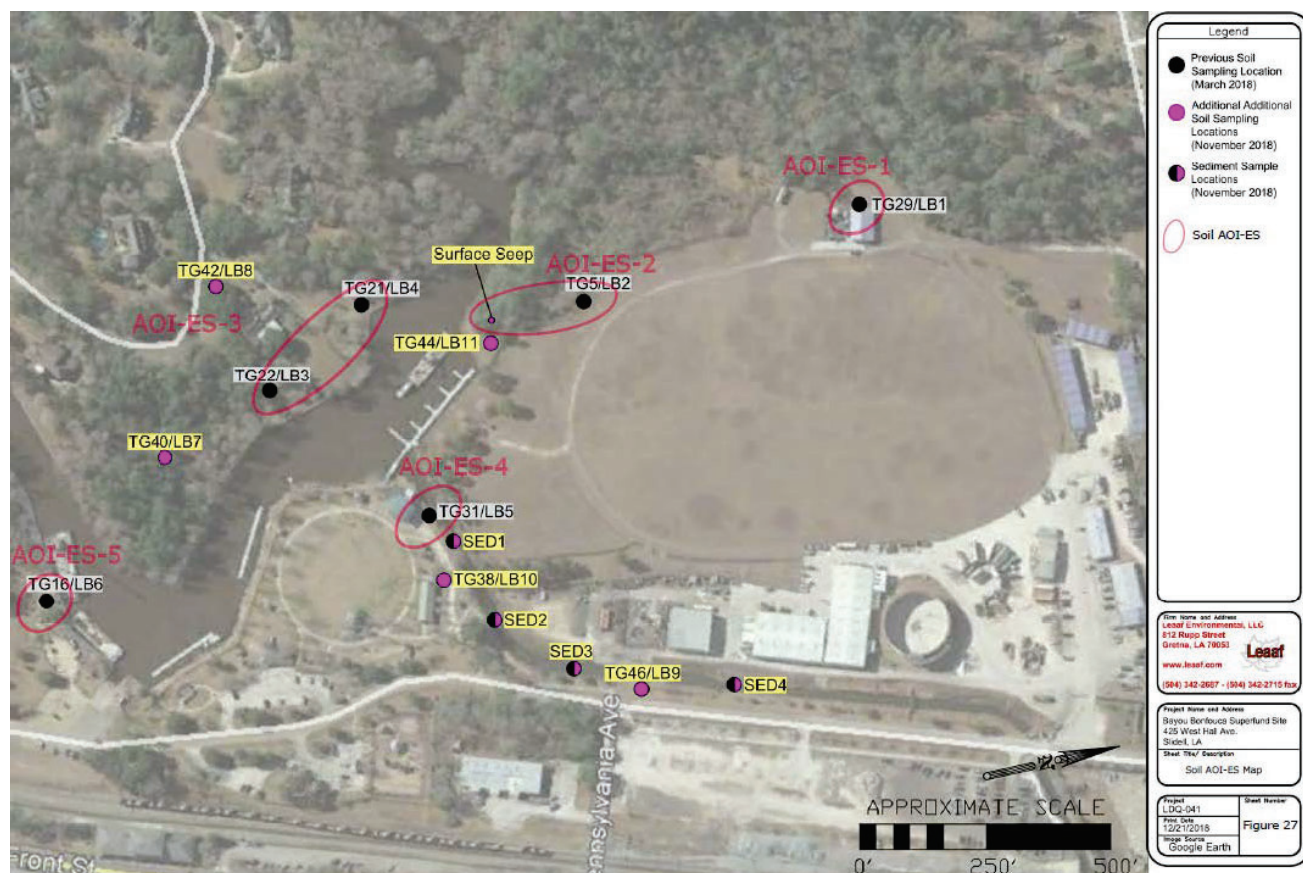
Due to the presence of VOCs in the subsurface soil and groundwater, LDEQ completed a vapor intrusion evaluation in June 2019 to address EPA's vapor intrusion concerns raised in the previous FYR. LDEQ conducted the vapor intrusion evaluation according to LDEQ's 2003 RECAP guidance. A summary of the soil and groundwater vapor intrusion evaluation is provided below.

Soil

LDEQ conducted an enclosed space evaluation for surface soil (0-15 feet bgs). LDEQ identified five areas of investigation for enclosed structures (AOI-ES) based on the proximity to enclosed structures, areas with the potential for future construction, and areas separated by geographical barriers (i.e., Bayou Bonfouca, drainage canal). The soil AOI-ES are shown in Figure H-1. All detected COCs in surface soil (0-15 feet bgs) with ES standards were included as COCs in the enclosed space evaluation. Following guidance in Appendix H of the RECAP Guidance Document, LDEQ compared the AOI maximum concentration to the limiting RECAP Standard. The limiting management option 1 (MO-1) RECAP Standards were the most stringent of the soil enclosed structure non-industrial standard (SoilESNI) (following additivity adjustment) and considering the saturation limit in soil (SoilSAT). As shown in Table H-2, most of the volatile contaminants in soil were below the limiting MO-1 ES RECAP Standard except for naphthalene in AOI-ES-1 and naphthalene, aliphatics (>C10-C12), aliphatics (>C12-C16), aromatics (>C10-C12), and aromatics (>C12-C16) in AOI-ES-4. The distribution of COCs that exceed the limiting RECAP Standard for surface soil is mapped on Figure H-2.

No COCs were detected at concentrations greater than the limiting MO-1 ES RECAP Standard in AOI-ES-3, located in the southwest adjoining residential neighborhood. The exceedances of non-industrial standards occurred at AOI-ES-1 and AOI-ES-4, which are located in industrial and recreational settings, respectively. In Heritage Park, there are several structures near AOI-ES-4, but they are open-air structures (i.e., pavilions, amphitheaters, etc.) and thus not a concern for vapor intrusion. The soil concentrations in this area were also compared to the industrial standards for an enclosed space Soil Enclosed Structure Industrial Standard (SoilESI), which shows the soil concentrations are below the industrial standards for current exposure (Table H-2).

Figure H-1: Soil-AOI ES Locations



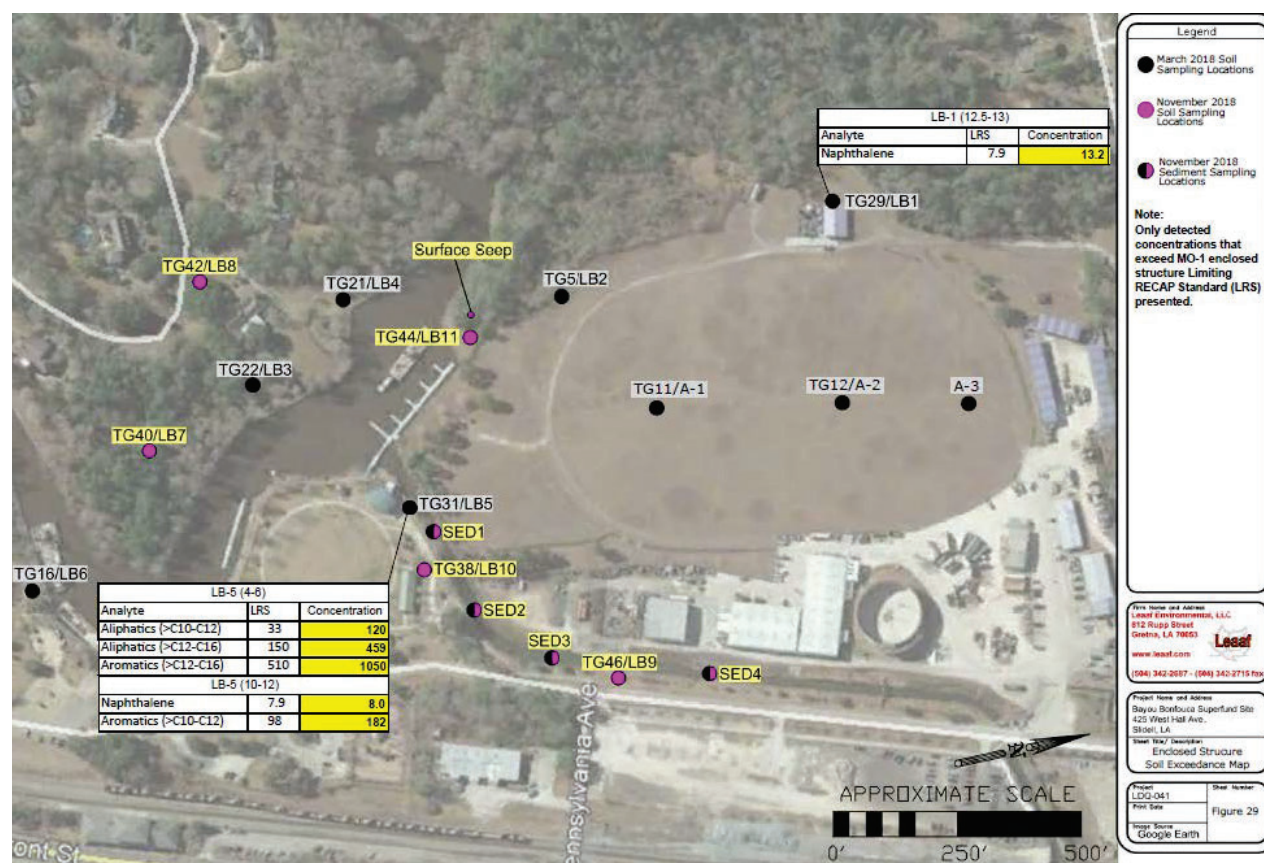
Source: Site Investigation and Risk Evaluation/Corrective Action Program Evaluation Report. Prepared by Leaaft for LDEQ. June 2019.

Table H-2: Non-industrial Soil Enclosed Structure RECAP Evaluation

| AOI | COC | Maximum Concentration (mg/kg) | Limiting RECAP Standard (mg/kg) |
|----------|-----------------------|-------------------------------|---------------------------------|
| AOI-ES-1 | Acetone | 0.0044 | 47 |
| | Benzene | 0.0034 | 1.0 |
| | Ethylbenzene | 0.0071 | 140 |
| | Toluene | 0.0088 | 3.9 |
| | Xylenes, Total | 0.0269 | 1.9 |
| | 2-Methylnaphthalene | 3.1 | 130 |
| | Acenaphthene | 19.5 | 5,200 |
| | Acenaphthylene | 0.47 | 2,700 |
| | Anthracene | 6.7 | 1,000,000 |
| | Biphenyl | 1.3 | 230 |
| | Dibenzofuran | 13.4 | 150 |
| | Fluorene | 22.5 | 32,000 |
| | Naphthalene | 13.2 | 7.9 (220) ^a |
| | Phenanthrene | 62.4 | 1,000,000 |
| | Pyrene | 11.9 | 83,000 |
| | Aliphatics (>C08-C10) | 3.3 | 6.1 |
| | Aliphatics (>C12-C16) | 7.2 | 150 |
| | Aromatics (>C10-C12) | 21.8 | 98 |
| | Aromatics (>C12-C16) | 102 | 510 |
| AOI-ES-2 | Acetone | 0.034 | 47 |
| | Carbon disulfide | 0.0047 | 0.15 |
| | 2-Methylnaphthalene | 0.076 | 130 |
| | Acenaphthene | 0.07 | 5,200 |
| | Acenaphthylene | 0.35 | 2,700 |
| | Anthracene | 0.45 | 1,000,000 |
| | Dibenzofuran | 0.079 | 150 |
| | Naphthalene | 0.21 | 7.9 |
| | Phenanthrene | 0.27 | 1,000,000 |
| | Pyrene | 2.5 | 83,000 |
| AOI-ES-3 | Acetone | 0.052 | 47 |
| | 2-Butanone | 0.012 | 4,700 |
| | Anthracene | 4.6 | 1,000,000 |
| | Naphthalene | 2.1 | 7.9 |
| | Phenanthrene | 1.8 | 1,000,000 |
| | Pyrene | 2.4 | 83,000 |
| AOI-ES-4 | Acetone | 0.051 | 47 |
| | Benzene | 0.013 | 1.0 |
| | Ethylbenzene | 0.062 | 140 |
| | Toluene | 0.014 | 3.9 |
| | Xylenes, Total | 0.127 | 1.9 |
| | 2-Methylnaphthalene | 34.5 | 130 |
| | Acenaphthene | 57.1 | 5,200 |
| | Anthracene | 105 | 1,000,000 |
| | Dibenzofuran | 35.7 | 150 |
| | Fluorene | 73.1 | 32,000 |
| | Naphthalene | 8.0 | 7.9 (220) ^a |
| | Phenanthrene | 234 | 1,000,000 |
| | Pyrene | 131 | 83,000 |
| | Aliphatics (>C08-C10) | 4.7 | 6.1 |
| | Aliphatics (>C10-C12) | 120 | 33 (1,100) ^a |
| | Aliphatics (>C12-C16) | 459 | 150 (5,200) ^a |
| | Aromatics (>C10-C12) | 182 | 98 (1,900) ^a |
| | Aromatics (>C12-C16) | 1,050 | 510 (10,000) ^a |
| AOI-ES-5 | Acetone | 0.033 | 47 |

| AOI | COC | Maximum Concentration (mg/kg) | Limiting RECAP Standard (mg/kg) |
|---|--------------|-------------------------------|---------------------------------|
| | Fluorene | 0.093 | 32,000 |
| | Phenanthrene | 0.29 | 1,000,000 |
| | Pyrene | 0.091 | 83,000 |
| <p><i>Notes:</i></p> <p><i>Source:</i> Site Investigation and Risk Evaluation/Corrective Action Program Evaluation Report. Appendix A, Tables 12-16. Prepared by Leaaf for LDEQ. June 2019.</p> <p>a. Value in parentheses is the default, minimum industrial standard (SoilESI) for enclosed structures as listed in 2003 RECAP guidance Appendix H, worksheet 12.</p> <p>Bold = AOI maximum concentration exceeds the RECAP limiting standard for indoor air for non-industrial use.</p> | | | |

Figure H-2: Locations where the Limiting Soil AOI-ES are Exceeded



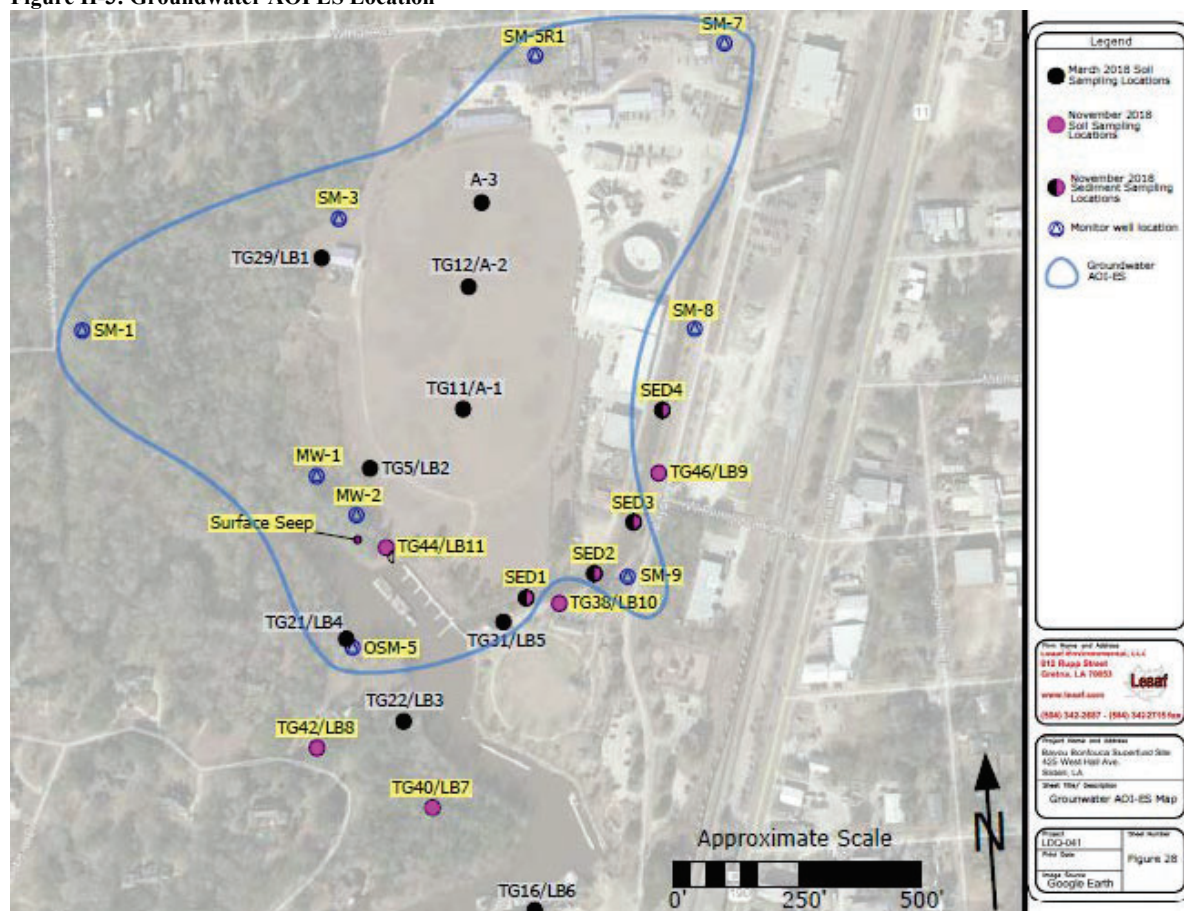
Source: Site Investigation and Risk Evaluation/Corrective Action Program Evaluation Report. Prepared by Leaa for LDEQ. June 2019.

Groundwater

LDEQ conducted an enclosed space evaluation for groundwater shallower than 15 feet bgs. The groundwater AOI-ES encompasses the sitewide groundwater (Figure H-3). All detected COCs in groundwater shallower than 15 feet bgs with ES standards were included as COCs in the enclosed space evaluation. Following guidance in Appendix H of the RECAP Guidance Document, LDEQ compared the AOI maximum concentration to the limiting RECAP Standard. The limiting groundwater RECAP Standards were the most stringent of the groundwater enclosed structure non-industrial standard (GWESNI) (following additivity adjustment) and the water solubility.

As shown in Table H-3, the maximum detections of volatile COCs in groundwater were below the limiting RECAP Standard except for anthracene, aliphatics (>C08 – C10) and naphthalene. As shown in Figure H-4, the anthracene maximum detection was collected in the vicinity of the residential neighborhood on the southwest adjoining property at well OSM-5, while the aliphatics (>C08 – C10) and naphthalene exceedances occurred in MW-1 and MW-2, respectively. The limiting RECAP Standard for anthracene, 0.043 mg/L, is the water solubility; however, the detected concentration is well below the GWESNI of 37,000 mg/L, which is specifically for the indoor air exposure pathway. There are no enclosed structures in the vicinity of MW-1 and MW-2, thus, the exceedances of the GWESNI at these locations represent a future residential exposure concern if an enclosed residential structure were to be built in this area. The concentrations of aliphatics (>C08 – C10) and naphthalene were also reviewed to determine if the concentrations of these COCs remain below the limiting standard at the residential location, OSM-5. The concentrations of aliphatics (>C08 – C10) is 0.19 mg/L and naphthalene is 0.28 mg/L, with both concentrations below the limiting GWESNI indicating that vapor intrusion is also not a concern for these two COCs at OSM-5. Overall, there are no sample locations with concentrations greater than the GWESNI standard within 10 feet of an enclosed structure.

Figure H-3: Groundwater AOI ES Location

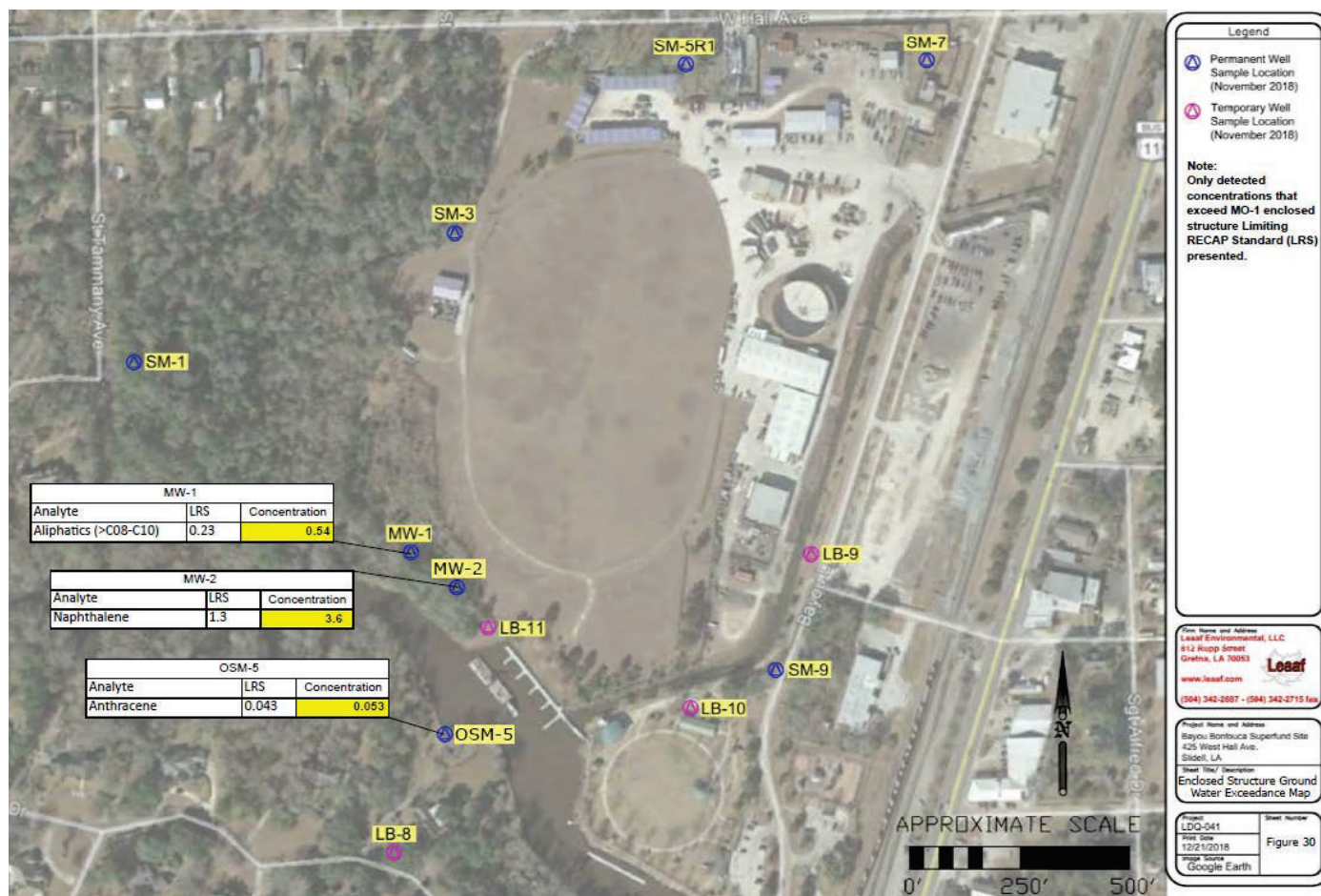


Source: Site Investigation and Risk Evaluation/Corrective Action Program Evaluation Report. Prepared by Leaf for LDEQ. June 2019.

Table H-3: Non-industrial Groundwater Enclosed Structure RECAP Evaluation

| COC | Maximum Groundwater (mg/L) | Limiting RECAP Standard (mg/L) |
|--|-----------------------------------|---------------------------------------|
| 2-Butanone | 0.00087 | 40000 |
| Acetone | 0.0069 | 410 |
| Benzene | 0.01 | 2.9 |
| Bromoform | 0.00034 | 18 |
| Carbon disulfide | 0.0013 | 0.88 |
| Ethylbenzene | 0.12 | 160 |
| Toluene | 0.01 | 6.4 |
| m&p-Xylenes | 0.12 | 3.3 |
| o-Xylenes | 0.046 | 3.3 |
| 2,2-Oxybis (1-chloropropane) | 0.00014 | 2.4 |
| 2-Methylnaphthalene | 0.35 | 11 |
| Acenaphthene | 0.22 | 4.2 (200) ^a |
| Acenaphthylene | 0.0048 | 16 (257) ^a |
| Anthracene | 0.053 | 0.043 (37000) ^a |
| Biphenyl | 0.014 | 7.5 (14) ^a |
| Dibenzofuran | 0.21 | 3.1 (1600) ^a |
| Fluorene | 0.17 | 2.0 (750) ^a |
| Naphthalene | 3.6 | 1.3 |
| Nitrobenzene | 0.0024 | 610 |
| Phenanthrene | 0.36 | 1.2 (73000) ^a |
| Pyrene | 0.11 | 0.14 (1000) ^a |
| Aromatics (>C10-C12) | 3.4 | 8.9 |
| Aromatics (>C12-C16) | 0.84 | 21 |
| Aliphatics (>C08-C10) | 0.54 | 0.23 |
| Aromatics (>C08-C10) | 0.65 | 3.6 |
| <p><i>Notes:</i></p> <p>a. The limiting standard is the contaminant water solubility, which is lower than the GWESNI included in the parentheses.</p> <p>Bold = maximum concentration exceeds the RECAP limiting standard.</p> <p><i>Source:</i> Site Investigation and Risk Evaluation/Corrective Action Program Evaluation Report. Appendix A, Table 17. Prepared by Leaaf for LDEQ. June 2019.</p> | | |

Figure H-4: Locations where the Limited Groundwater AOI-ES are Exceeded



Source: Site Investigation and Risk Evaluation/Corrective Action Program Evaluation Report. Prepared by Leaaf for LDEQ. June 2019

EPA Vapor Intrusion Screening Level (VISL) Calculator

Using the 2015 EPA vapor intrusion guidance, EPA conducted an evaluation using EPA's 2021 VISL calculator to estimate cancer and noncancer risk. Several contaminants were sufficiently volatile and were detected in well OSM-5, which is near the residences near Array 3. To determine if vapor intrusion is a potentially completed pathway to residents, the VOC concentrations from OSM-5 from the November 2018 RECAP investigations were entered into the VISL calculator using standard default exposure assumptions for a resident.

As shown in Table H-4, the screening-level vapor intrusion risk evaluation indicates that the cumulative cancer risk is within EPA's risk management range but the noncancer HI is 26 due primarily to naphthalene, aromatics and aliphatics. These results indicate that additional evaluation is necessary. The more advanced vapor intrusion model integrating site specific conditions (e.g., Johnson and Ettinger) could not be run since the groundwater is less than 5 feet from the foundation (depth to groundwater at OSM-5 is <1 foot) which violates the model assumptions. This suggests that this pathway may need to be evaluated further with multiple lines of evidence specifically near shallow well OSM-5. OSM-5 is located about 200 feet north-northeast of the residential enclosed structure. Groundwater flows south to southeast, towards the bayou and not in the direction of the residential enclosed structure. Additionally, soil sampling (LB8) conducted in 2018 in the front yard of the same residential property identified no detections of contaminants. EPA will completely evaluate this pathway within the next year.

Table H-4: Screening-Level Vapor Intrusion Risk Evaluation at OSM-5

| Contaminant | Groundwater Concentration in OSM-5 during November 2018 (µg/L) ^a | Cancer Risk ^b | Noncancer HQ ^b |
|---|---|--------------------------|---------------------------|
| Acetone | 3.5 | - | 0.000000155 |
| Benz[a]anthracene | 37 | 1.07 x 10 ⁻⁶ | - |
| Benzene | 1.8 | 1.13 x 10 ⁻⁶ | 0.0131 |
| Biphenyl, 1,1'- | 14 | - | 0.423 |
| Bromoform | 0.26 | 2.23 x 10 ⁻⁹ | - |
| Ethylbenzene | 23 | 6.60 x 10 ⁻⁶ | 0.00711 |
| Naphthalene | 280 | 6.10 x 10 ⁻⁵ | 1.61 |
| Nitrobenzene | 1.2 | 1.68 x 10 ⁻⁸ | 0.000125 |
| Toluene | 1.3 | - | 0.0000677 |
| Total Petroleum Hydrocarbons (Aliphatic Low) | 190 | - | 22.3 |
| Total Petroleum Hydrocarbons (Aromatic Low) | 190 | - | 1.38 |
| Xylenes | 33 | - | 0.0858 |
| <i>Total:</i> | | 6.98 x 10 ⁻⁵ | 25.9 |
| <i>Notes:</i> a. Data obtained from Table 6 of the 2019 Site Investigation and RECAP Evaluation Report. b. Risk and HQ calculated using EPA's VISL: https://epa-visl.ornl.gov/cgi-bin/visl_search assuming a residential scenario and default groundwater temperature of 25 degrees Celsius, accessed 1/8/2021. Bold = exceedance of EPA's target HQ of 1 | | | |

Soil above RECAP standards

As shown in Figure F-3 in Appendix F, three soil samples and one surface seep sample from the 2018 investigations exceeded RECAP limiting standards. Of these, one soil sample and one surface seep sample are located within the industrial site property and below the ROD cleanup goal. The two other soil

samples, LB4 and LB5, are in residential and recreational areas, respectively (Figure F-3). To evaluate whether the concentrations present any unacceptable potentially completed exposure pathways in these non-industrial, likely accessible by the general public, areas, the site COC concentrations (of the PAHs specified in the ROD) from the 2018 investigations were compared to the EPA's current RSLs for residential and commercial use scenarios. There are no RSLs published for a recreational use scenario. RSLs incorporate current toxicity values and standard default exposure factors.

LB5 is located in Heritage Park near the eastern drainage channel (Figure F-3). As seen below in Table H-5, concentrations for LB5 correspond to acceptable risk levels under an industrial scenario but slightly exceed acceptable risk levels for a residential scenario. However, residential exposure assumptions are likely overly conservative for this location. For residential exposure, a default exposure frequency of 350 days per year with an averaging time of 30 years for noncancer risks and 70 years for cancer risks are assumed. It is unlikely recreational users of the Site are experiencing this frequency and duration of exposure.

LB4 is located near the residential area across the bayou (Figure F-3). As seen below in Table H-6, concentrations for LB4 correspond to acceptable risk levels under both industrial and residential scenarios, indicating that this does not currently present an unacceptable exposure pathway.

Table H-5: Soil Screening-Level Risk Assessment for LB5 (4-6)

| COC | Concentration (mg/kg) ^a | EPA RSL (mg/kg) ^b | | | | Risk Level | | | |
|--|---------------------------------------|------------------------------|--------|------------------------------|--------|-----------------------------|------------------------------|-----------------------------|------------------------------|
| | | Residential | | Industrial | | Residential | | Industrial | |
| | | 1 x 10 ⁻⁶ Risk | HQ = 1 | 1 x 10 ⁻⁶ Risk | HQ = 1 | Cancer Risk ^c | Noncancer HQ ^d | Cancer Risk ^c | Noncancer HQ ^d |
| Benzo(a)pyrene | 23.6 | 0.11 | 18 | 2.1 | 220 | 2.1 x 10 ⁻⁴ | 1.3 | 1.1 x 10 ⁻⁵ | 0.11 |
| Benzo(a)anthracene | 38.1 | 1.1 | - | 21 | - | 3.5 x 10 ⁻⁵ | - | 1.8 x 10 ⁻⁶ | - |
| Benzo(b)fluoranthene | 35.9 | 1.1 | - | 21 | - | 3.3 x 10 ⁻⁵ | - | 1.7 x 10 ⁻⁶ | - |
| Benzo(k)fluoranthene | <64.6 | 11 | - | 210 | - | 5.9 x 10 ⁻⁶ | - | 3.1 x 10 ⁻⁷ | - |
| Chrysene | 41.2 | 110 | - | 2,100 | - | 3.7 x 10 ⁻⁷ | - | 2.0 x 10 ⁻⁸ | - |
| Indeno(1,2,3-cd) pyrene | <64.6 | 1.1 | - | 21 | - | 5.9 x 10 ⁻⁵ | - | 3.1 x 10 ⁻⁶ | - |
| <i>Totals:</i> | | | | | | 3.5 x 10 ⁻⁴ | 1.3 | 1.8 x 10 ⁻⁵ | 0.11 |
| <p><i>Notes:</i></p> <p>a. Concentrations from Table 4 of June 2019 Site Investigation and RECAP Evaluation Report.</p> <p>b. November 2020 RSLs accessed on 1/13/2021 at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables.</p> <p>c. Cancer risk was calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10⁻⁶ risk: cancer risk = (concentration / cancer RSL) x 10⁻⁶.</p> <p>d. Noncancer risk was calculated using the following equation, based on the fact that RSLs are derived based on a hazard quotient (HQ) of 1: noncancer risk = concentration / noncancer RSL.</p> <p>< = concentration not detected.</p> <p>Highlight = risk exceeds EPA's target risk range of 1 x 10⁻⁶ to 1 x 10⁻⁴ for cancer risk or noncancer HQ = 1.</p> | | | | | | | | | |

Table H-6: Soil Screening-Level Risk Assessment for LB4 (5-5.5)

| COC | Concentration (mg/kg) | EPA RSL (mg/kg) ^b | | | | Risk Level | | | |
|------------------------|--------------------------|------------------------------|--------|------------------------------|--------|-----------------------------|------------------------------|-----------------------------|------------------------------|
| | | Residential | | Industrial | | Residential | | Industrial | |
| | | 1 x 10 ⁻⁶ Risk | HQ = 1 | 1 x 10 ⁻⁶ Risk | HQ = 1 | Cancer Risk ^c | Noncancer HQ ^d | Cancer Risk ^c | Noncancer HQ ^d |
| Benzo(a)pyrene | 3.4 | 0.11 | 18 | 2.1 | 220 | 3.1 x 10 ⁻⁵ | 0.2 | 1.6 x 10 ⁻⁶ | 0.02 |
| Benzo(a)anthracene | <6.6 | 1.1 | - | 21 | - | 6.0 x 10 ⁻⁶ | - | 3.1 x 10 ⁻⁷ | - |
| Benzo(b)fluoranthene | 4.7 | 1.1 | - | 21 | - | 4.3 x 10 ⁻⁶ | - | 2.2 x 10 ⁻⁷ | - |
| Benzo(k)fluoranthene | 1.8 | 11 | - | 210 | - | 1.6 x 10 ⁻⁷ | - | 3.1 x 10 ⁻⁸ | - |
| Chrysene | <6.6 | 110 | - | 2,100 | - | 6.0 x 10 ⁻⁸ | - | 3.1 x 10 ⁻⁹ | - |
| Indeno(1,2,3-cd)pyrene | 4 | 1.1 | - | 21 | - | 3.6 x 10 ⁻⁶ | - | 1.9 x 10 ⁻⁷ | - |
| <i>Totals:</i> | | | | | | 4.5 x 10 ⁻⁵ | 0.2 | 2.4 x 10 ⁻⁶ | 0.02 |

Notes:

- Concentrations from Table 4 of June 2019 Site Investigation and RECAP Evaluation Report.
 - November 2020 RSLs accessed on 1/13/2021 at <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>.
 - Cancer risk was calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10⁻⁶ risk: cancer risk = (concentration / cancer RSL) x 10⁻⁶.
 - Noncancer risk was calculated using the following equation, based on the fact that RSLs are derived based on a hazard quotient (HQ) of 1: noncancer risk = concentration / noncancer RSL.
- < = concentration not detected.

APPENDIX I – INTERVIEW FORMS

| BAYOU BOUFOUCA SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM | |
|---|--|
| Site Name: Bayou Bonfouca | |
| EPA ID: LAD980745632 | |
| Interviewer name: N/A | Interviewer affiliation: N/A |
| Subject name: Blaine Clancy, P.E. | Subject affiliation: Slidell City Engineer |
| Subject contact information: bclancy@cityofslidell.org | |
| Interview date: 12/1/2020 | Interview time: 2:30 PM |
| Interview location: Email | |
| Interview format (circle one): In Person Phone Mail Email Other: | |
| Interview category: Local Government | |

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date? **Yes**

2. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future? **Yes**

3. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing? **No**

4. Are you aware of any changes to state laws or local regulations that might affect the protectiveness of the Site's remedy? **No**

5. Are you aware of any changes in projected land use(s) at the Site? **No**

6. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future? **Yes. Current method is working.**

7. Do you have any comments, suggestions or recommendations regarding the project? **EPA and DEQ have done a fantastic job regarding the project. Their willingness to work with the local agency has proved beneficial to the overall project.**

8. Do you consent to have your name included along with your responses to this questionnaire in the FYR report? **Yes**

| BAYOU BOUFOUCA SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM | |
|--|--------------------------------|
| Site Name: Bayou Bonfouca | |
| EPA ID: LAD980745632 | |
| Interviewer name: | Interviewer affiliation: |
| Subject name: Keith Horn | Subject affiliation: La. DEQ |
| Subject contact information: Keith.Horn@LA.GOV (225) 223-1216 | |
| Interview date: 12/03/2020 | Interview time: 8:40AM- 2:50PM |
| Interview location: Keith Horn's residence (Working From Home) | |
| Interview format (circle one): In Person Phone Mail (Email) Other: | |
| Interview category: State Agency | |

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

The Bayou Bonfouca Superfund Site has been a very successful cleanup in that it addressed a very seriously contaminated water body, and the plant site itself. The La. DEQ took over Operations and Maintenance (O&M) and continues to run the groundwater treatment system at the site.

Site reuse has been very successful, with a portion on the former property being converted into Slidell's Heritage Park which is a community asset, and another portion of the site being converted to the Slidell Public Works Facility.

2. What is your assessment of the current performance of the remedy in place at the Site?

The sediment remedy has been very successful as recent sampling of Bayou Bonfouca has demonstrated, this resulted in the lifting of the water and sediment contact advisory by the State of Louisiana. The soil remedy appears to have been also very successful in reducing exposure in surface soil.

The groundwater remedy does not appear to be as successful, and it is unlikely that the Remedial Goals (EPA MCLs) can be reached using the pump and treat methods. However, it does appear that the pump and treat operation may be performing as a containment remedy, so it has some value in that regard.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?

The Slidell Department of Public Works cleared some trees along the outside of the facility fence on West Hall Street in August of 2017, causing residents to complain to both the EPA and the LDEQ. EPA met with the residents and discussed these concerns. The City of Slidell

subsequently ceased clearing operations and plans to develop a parking facility at that location.

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities.

The La. DEQ has been very active in Operations and Maintenance (O&M) and continues to run the groundwater treatment system at the site. This involves two full-time contractor employees. In 2020, the La. DEQ had our contractors replace six failed recovery wells in Array 2 in order to improve the efficiency of the groundwater treatment system.

In 2020, the La. DEQ had our contractors conduct a sediment investigation of the entire length of Bayou Bonfouca. This resulted in the lifting of the water and sediment contact advisory by the State of Louisiana.

The La. DEQ had its contractors conduct an extensive soil and groundwater site investigation from late 2017 through 2019 to delineate the extent of remaining contamination and to explore additional pathways such as enclosed space vapor intrusion.

During this period there have been extensive communications between the La. DEQ, EPA, the City of Slidell, and various contractors. The La. DEQ has made numerous inspections of the site during this period. All of these can be reviewed in the La. DEQ Electronic Data Management System (EDMS).

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?

I am not aware of any changes that would have an impact on the protectiveness of the Site's remedy.

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

A Conveyance Notice was filed on April 22, 2008 which restricted use of the site and adjacent Public Works property to industrial/commercial, protected the landfill, and prohibited use of groundwater in this area. So this area appears to have been addressed.

There are no institutional controls on off-site areas, and these are needed. The EPA has initiated discussions and held meetings with the City of Slidell and St. Tammany Parish regarding these controls, but as of yet none have been implemented. These controls are needed on the private property on the southwest side of the Bayou, and recent investigations show these are also needed at Slidell's Heritage Park.

7. Are you aware of any changes in projected land use(s) at the Site?

I am not aware of any such planned changes.

| BAYOU BOUFOUCA SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM | |
|---|--|
| Site Name: Bayou Bonfouca | |
| EPA ID: LAD980745632 | |
| Interviewer name: Rick Tibbs | Interviewer affiliation: Onsite Contractor |
| Subject name: | Subject affiliation: |
| Subject contact information: | |
| Interview date: 1/12/21 | Interview time: 12:00 |
| Interview location: Bayou Bonfouca site | |
| Interview format (circle one): In Person Phone Mail Email Other: | |
| Interview category: O&M Contractor | |

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)? Cleanup is taking place as designed. Understand cleanup is taking a long time that is the nature of the waste. Maintenance is always a challenge, Maintenance is ongoing and a daily process. System is maintained and performing as designed. There has been many reuse projects. Reuse is also limited, due to the site being a fully active superfund site.
2. What is your assessment of the current performance of the remedy in place at the Site? System and equipment is old and out dated, but does work and is recovering waste as designed.
3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site? Monitoring data shows contaminant is being recovered. I have been involved with this project over 30 years now, I know from experience that recovery is taking place and looking back, levels/recovery is reducing.
4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence. We have two onsite operators every day. We man the site approximately 55 hours a week, 7 days a week, including weekends and holidays. System has an alarm system in place and we are available 24 hours a day to respond to any problems. Daily activities include reporting, sampling, maintenance, trouble shooting and evaluating system to get the most out of recovery of the contamination.
5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts. No changes. Operations are steady state.

| BAYOU BOUFOUCA SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM | |
|--|---------------------------------------|
| Site Name: Bayou Bonfouca | |
| EPA ID: LAD980745632 | |
| Interviewer name: Casey Luckett Snyder | Interviewer affiliation: RPM |
| Subject name: Private resident | Subject affiliation: Community member |
| Subject contact information: | |
| Interview date: 02/08/2021 | Interview time: 10am |
| Interview location: Telephone | |
| Interview format (circle one): In Person X Phone Mail Email Other: | |
| Interview category: Resident | |

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

Yes. She keeps a notebook of site activities and visits the EPA website.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

Heritage Park is enjoyable – great job. Maintenance, grass cutting, etc. of landfill property all looks good. Appreciates that O&M contractor does not cut buffer area outside of fence across the street from her kitchen window. Reuse of park is beautiful but not direct benefit for neighbors across the street from the site. She has a regular visual of site activities. She has not seen the creosote tank emptied but we discussed it occurs very infrequently. Also discussed that treated groundwater is sampled prior to discharge to Bayou Bonfouca.

3. What have been the effects of this Site on the surrounding community, if any?

Many people have moved from the area since the cleanup. Census data on website of surrounding community is dated and not accurate/does not reflect current trends in the neighbor. She requested it be updated. She does not know of any effects that are directly related to the Site. People are aware that there is a beautiful park and people enjoy it.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

No, she is not aware of any trespassing or vandalism, nothing unusual or unexpected occurring on the Site. Suggested adding gravel to the City access off of West Hall if access continue to be needed. I explained that was built for the drilling rig required to drill the new MW five years ago. She has noticed activities on the City public works site occurring 24 hours per day and on the weekend in the past couple of weeks.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site?
How can EPA best provide site-related information in the future?

She feels like she is self-informed but that EPA has been responsive to her concerns. Yes EPA has provided information as requested. She thought an open house might be well received by the community. She thought people would want to hear from EPA.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?
No private well. City water supplied. NA.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

Comment - She does still smell creosote occasionally, most recently late last week. Not sure if its creosote but it is definitely not gasoline. Is there any local storage facilities that occasionally vent hydrocarbons?

No other suggestions or recommendations.

She complimented me on my sincere outreach to her as long term resident who lives across the street from Site.

APPENDIX J – INSTITUTIONAL CONTROLS



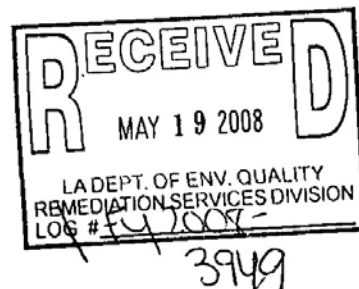
The City of Slidell

BEN O. MORRIS, Mayor

Post Office Box 828 • Slidell, Louisiana 70459
Telephone (985) 646-4396 Fax (985) 646-4397

TIMOTHY MATHISON
City Attorney

May 15, 2008



Keith L. Casanova, Administrator
Remediation Services Division
P. O. Box 4314
Baton Rouge, LA 70821-4314

Re: Request to File Conveyance Notice
Bayou Bonifouca AI Number: 4716

Dear Mr. Casanova:

| | |
|------------------------------------|----------------------|
| Remediation Services Division | |
| Manager: | <i>Twiley</i> |
| Team Leader: | <i>Johnny</i> |
| AI #: | <i>4716</i> |
| TEMPO Task #: | |
| <input type="checkbox"/> Desk Copy | File Room: <i>AS</i> |

The Conveyance Notification referenced above was recorded with the Clerk of Court's Office in Covington on May 7, 2008. As requested in Rich Johnson's letter received April 10, 2008, enclosed are triplicates of the document recorded on May 7, 2008, identified as Instrument No. 1680636.

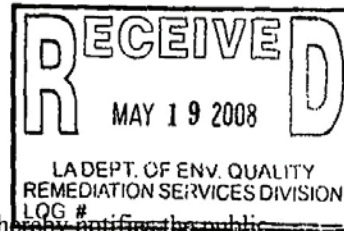
Sincerely yours,

A handwritten signature of Timothy Mathison.

Timothy Mathison
City Attorney

TM/jkf
Enc.

CONVEYANCE NOTIFICATION



The Louisiana Department of Environmental Quality (LDEQ) hereby notifies the public that the property depicted in the figure attached hereto as Exhibit 1 (hereinafter "the Bayou Bonfouca Superfund site" or "the Site") and described in the property description attached hereto as Exhibit 2 has been used to manage hazardous constituents and is the subject of a response action under the federal Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §9601 *et seq.* The Site was closed with hazardous constituents remaining in the soil and the groundwater above levels that allow for unrestricted exposure. The contaminant levels present are acceptable for industrial/commercial use of the property as described in the LDEQ Risk Evaluation/Corrective Action Program (RECAP), Section 2.9. In accordance with Louisiana Administrative Code 33:1, Chapter 13, if land use changes from industrial to non-industrial, the responsible party shall notify the LDEQ within 30 days and the property shall be reevaluated to determine if conditions are appropriate for the proposed land use.

The CERCLA remedy includes but is not limited to:

- capped subsurface soils;
- recovery wells;
- monitoring wells and piezometers;
- groundwater contaminant extraction; and
- water treatment systems.

St. Tammany Parish 1227
Instrmnt #: 1680636
Registry #: 1829190 PSH
5/7/2008 8:30:00 AM
MR CB X MI UCC

An aerial photo of the site is attached as Exhibit 1. Disturbance of, destruction of, interference with, or in any way damaging or altering elements of the CERCLA remedy, or disturbing or removing soil or groundwater, without authorization from LDEQ, EPA, or their successor agencies may result in legal liability under CERCLA, the LEQA, or other laws.

The property may be subject to additional future environmental requirements under CERCLA or the Louisiana Environmental Quality Act as may be determined necessary by EPA, LDEQ, or their successor agencies. An owner of the property may be held jointly and severally liable under federal law, or liable *in solido* under Louisiana law, for any environmental response action required on the property.

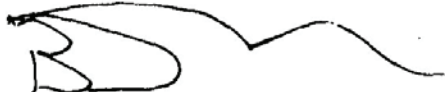
Information regarding the Bayou Bonfouca Superfund site is available in the LDEQ public record and may be obtained by contacting the LDEQ Records Manager at (225) 219-3168. Records regarding the Site may be viewed at LDEQ Headquarters, 602 N. Fifth Street, First Floor, Baton Rouge, LA 70802. Inquiries should refer to Agency Interest Number 316.

The US Environmental Protection Agency's original source control (sediments, soil, Services Division waste piles) Record of Decision for the Site is dated August 15, 1985. A second Record of Decision was issued by EPA on March 31, 1987 to address contaminated groundwater.

| | |
|------------------------------------|-------------------------------------|
| AI #: | |
| TEMPO Task #: | |
| <input type="checkbox"/> Desk Copy | <input type="checkbox"/> File Room: |

An Explanation of Significant Differences was signed in 1990, which addressed several technical and cost issues concerning ground water remediation. The Bayou Bonfouca site bears EPA ID LAD980745632, Site ID No. 0600574.

This notification shall remain effective from the date of its filing until the property (soil and groundwater) subject to this notification can support unlimited uses and unrestricted exposure.



Signature of Person Filing Parish Record

BEN O. MORRIS MAYOR.
Typed Name and Title of Person Filing Parish Record

22 April 2008
Date

Exhibit 1: Bayou Bonfouca Site Diagram

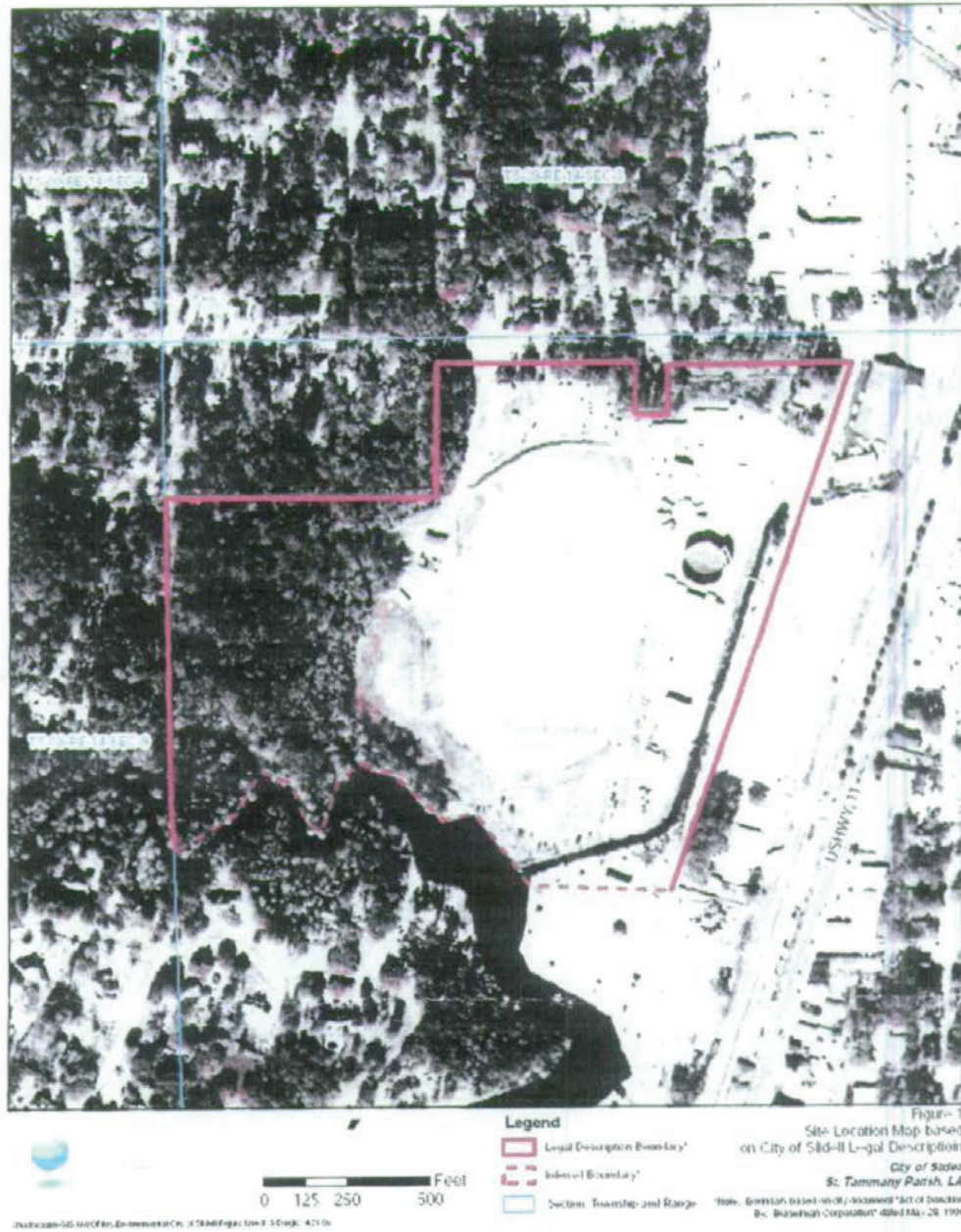


Exhibit 2

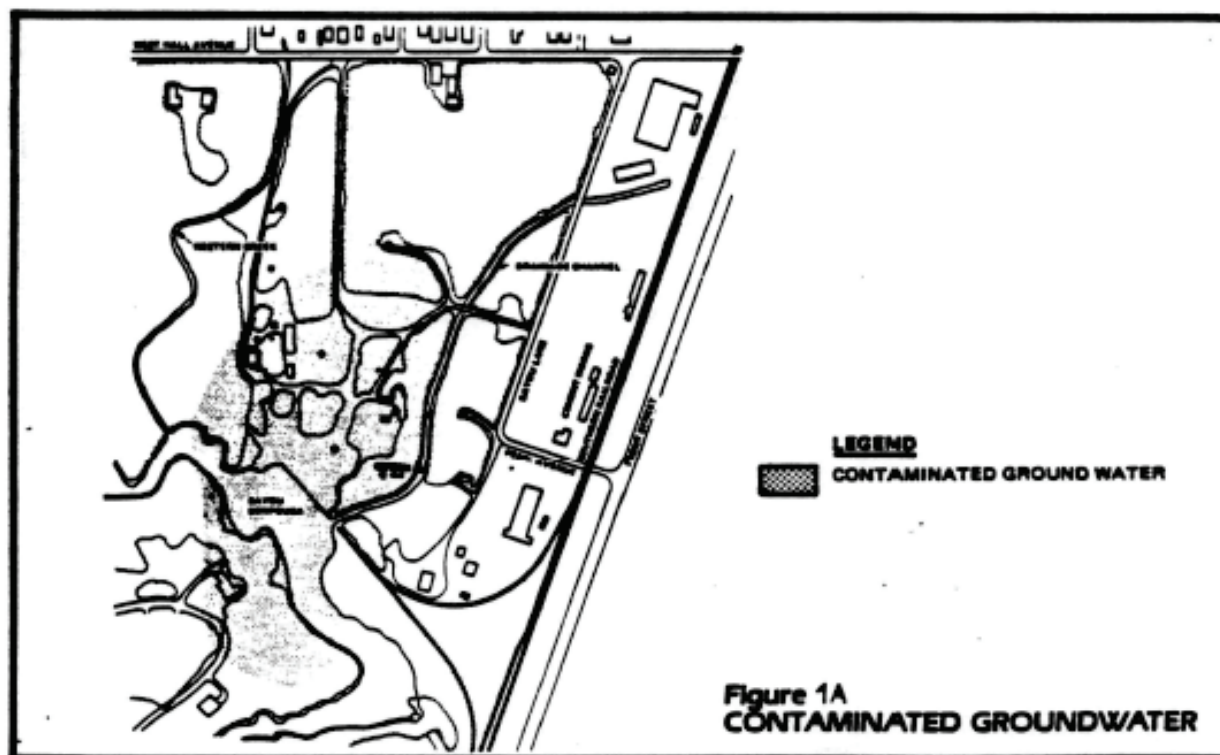
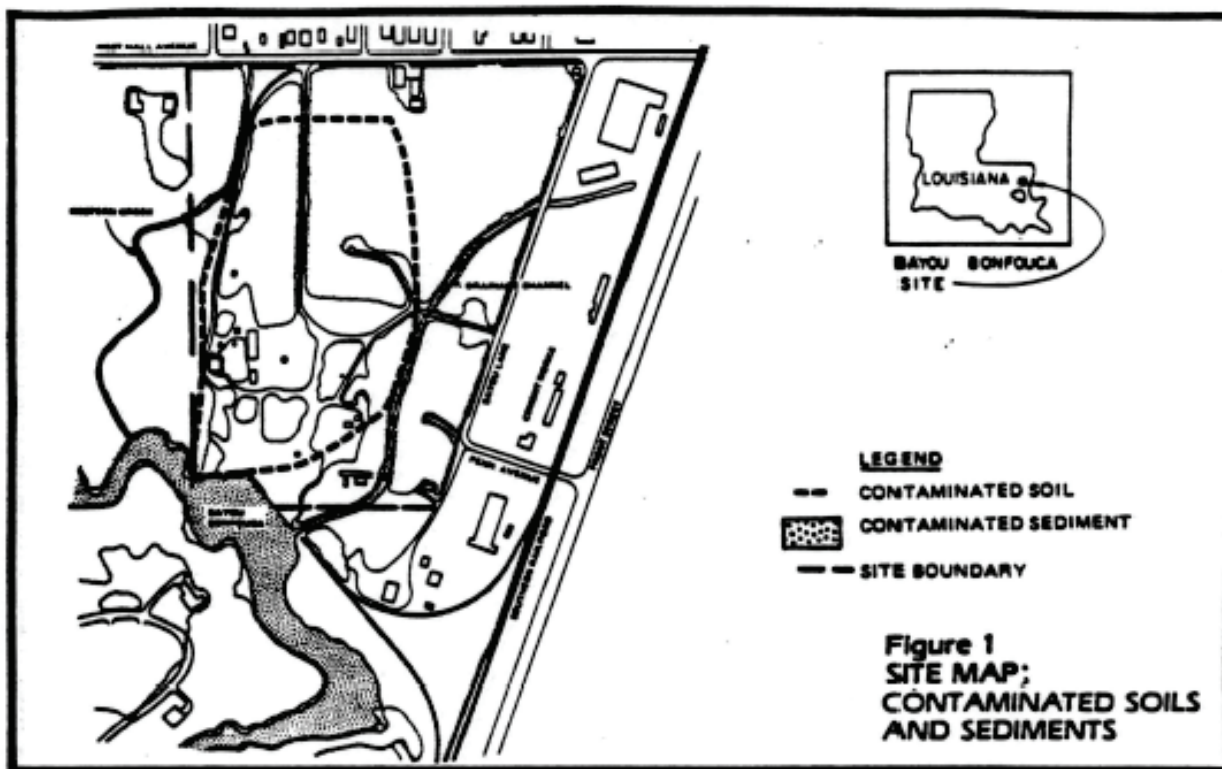
Bayou Bonfouca Superfund Site Property Description

The site is located on approximately 54 acres of land located south of West Hall Avenue and north and adjacent to Bayou Bonfouca in Slidell, St Tammany Parish, Louisiana. The legal description of the site is as follows:

That portion of ground, together with all the buildings and improvements thereon, and all of the rights, ways, privileges, servitudes, appurtenances and advantages thereunto belonging or in anywise appertaining, 54.29 acres situated in the Northwest Quarter of Section 10, Township 9 South, Range 14 East, described as follows:

Beginning at the intersection of the line between Sections 9 and 10 and Bayou Bonfouca go North 900 feet, more or less to a point 450 feet South of the corner common to Sections 3,4,9 and 10; thence East 815 feet; thence North 400 feet; thence East 600 feet; thence South 150 feet; thence East 100 feet; thence North 150 feet; thence East 555.49 feet; thence South 18 degrees, 55 minutes West 1,647.13 feet; thence West 447.7 feet, more or less to Bayou Bonfouca; thence with the meander of Bayou Bonfouca upstream to the point of departure.

APPENDIX K – HISTORICALLY CONTAMINATED SITE AREAS⁶



⁶ From the 1987 ROD.